REPORT NUMBER TR-P27003-04-NC

NEW CAR ASSESSMENT PROGRAM
SIDE IMPACT TEST

HYUNDAI MOTOR MANUFACTURING ALABAMA, LLC
2007 HYUNDAI SANTA FE SE 5-DOOR MPV
5-DOOR MPV

NHTSA NUMBER: M70501

Prepared By:
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AUGUST 28, 2006

FINAL REPORT

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U.S. DEPARTMENT OF TRANSPORTATION
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_____
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_____
Date of Acceptance

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16. Abstract

A 55/28 km/h 90 deg. Moving Deformable Barrier Side Impact NCAP Test was conducted on the subject 2007 Hyundai Santa Fe SE in accordance with the specifications of the Office of Crash Worthiness Standards Test Procedures for the generation of consumer information on vehicle side crash protection. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on August 28, 2006. The impact velocity of the Moving Deformable Barrier was 61.94 km/h and the outside ambient temperature at the struck (driver's) side of the vehicle was 33.7 deg. C. The target vehicle's maximum post-test static crush was 302 mm located at level 2. The test vehicle's occupant performance data is as follows:

Measurement Description	Driver SID/HIII	Pass. SID/HIII
Left Upper Rib (LUR) G's	37.2	27.9
Left Lower Rib (LLR) G's	34.4	34.8
Lower Spine (T_{12}) G's	30.3	37.4
Thoracic Trauma Index (TTI) G's	34.0	36.0
Pelvis (PEV) G's	44.0	57.0

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New Car Assessment Program (NCAP) Side Impact Moving Deformable Barrier (MDB) Side Impact Dummy (SID/HIII)	Copies of this report are available from: National Highway Traffic Safety Admin. NHTSA Technical Reference Division 400 Seventh St., SW, Room 5108 Washington, DC 20590

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SECTION 1
PURPOSE AND TEST PROCEDURE

1.1 PURPOSE

This Side Impact NCAP test is conducted as part of the FY' 2007 test program sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract No. DTNH22-03-D-32005. The purpose of this test is to generate comparative side impact data on a 2007 Hyundai Santa Fe SE 5-Door MPV manufactured by Hyundai Motor Manufacturing Alabama, LLC.

1.2 TEST PROCEDURE

The side impact test was conducted in accordance with the current National Highway Traffic Safety Administration (NHTSA), Office of Crashworthiness Standards (OCS), laboratory test procedure NCAP Side Impact Testing, dated November 2002. The procedures for receiving, inspection, testing, and reporting of test results are described in the test procedures and are not repeated in this report.

SECTION 2
SUMMARY OF SIDE IMPACT TEST

2.1 SUMMARY OF SIDE IMPACT NCAP TEST

A model year 2007 Hyundai Santa Fe SE 5-Door MPV was impacted on the left (driver's) side by a Moving Deformable Barrier (MDB) which was moving forward in a 27° crabbed position to the tow road guidance system at a velocity of 61.94 km/h. The specified impact velocity range is from 61.14 to 62.75 km/h. The test (target) vehicle was stationary and positioned 63° to the line of forward motion. The weight of the vehicle as tested was 2052 kg and the test weight of the MDB was 1361 kg. The test was conducted at KARCO Engineering, LLC in Adelanto, California, on August 28, 2006.

Two (2) real-time cameras and eleven (11) high-speed video cameras were used to document the impact event. Camera locations and pertinent camera information is documented in the data sheets. Pre- and post-test photographs of the vehicle and SID/HIIIs can be found in Appendix A. Two 50th percentile adult male Side Impact Dummies, Hybrid III (SID/HIIIs) were placed in the driver's and left rear passenger designated seating positions according to the test procedure. Each SID/HIII is instrumented with contact switches on the pelvis, thorax and six-axis neck load cells, and fourteen accelerometers in the following locations:

- Left Upper Rib (LUR) uni-axial accelerometer (Y-axis primary and redundant)
- Left Lower Rib (LLR) uni-axial accelerometer (Y-axis primary and redundant)
- Lower Thoracic Spine (T12) uni-axial accelerometer (Y-axis primary and redundant)
- Pelvic (PEV) section uni-axial accelerometer (Y-axis primary and redundant)
- Head Center of Gravity (CG) tri-axial accelerometers (X, Y, and Z axes primary and redundant)

SUPPLEMENTAL RESTRAINT INFORMATION

Restraint Type	Left Front Driver		Left Rear (Passenger)	
	Installed	Deployed	Installed	Deployed
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes

The test vehicle was instrumented with twenty-one (21) structural accelerometers and the MDB was instrumented with five (5) accelerometers and one (1) contact switch on the right bumper to compare left side to right side bumper impact timing. All data channels were recorded with the fully self contained on-board Data Acquisition System (DAS). The data was digitally sampled at 10,000 samples per second and processed per Appendix V of the Test Procedure.

2.2 GENERAL COMMENTS

The driver and passenger doors remained closed during impact. The test vehicle sustained a maximum static crush of 302 mm at level 2, 1500 mm rearward of the left vertical impact point. The driver SID/Hybrid III, Serial No. 275 and the passenger SID/Hybrid III, Serial No. 274 were calibrated prior to this test. The SID/Hybrid III injury criteria is summarized as follows:

Measurement	Units	Driver	Passenger
Thoracic Trauma Index (TTI)	G's	34.0	36.0
Peak Pelvic G's (PEV)	G's	44.0	57.0

Tests summaries and post-test observations are presented in Section 3. Appendix A contains the still photograph prints. Appendix B contains the driver and passenger SID/HIIIs, vehicle, and MDB response data traces. Appendix C contains the SID Configuration and performance verification data.

SECTION 3

OCCUPANT AND VEHICLE INFORMATION SHEETS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

CONVERSION FACTORS USED IN THIS REPORT*

Quantity	Typical Application	Std Units	Metric Unit	Multiply By
Mass	Vehicle Weight	lb	kg	0.4536
Linear Velocity	Impact Velocity	mile/h	km/h	1.609
Length or Distance	Measurements	in	mm	25.4
Volume	Fuel Systems	gal	liter	3.785
Volume	Small Fluids	oz	mL	29.573
Pressure	Tire Pressures	lbf/in^2	kPa	7.0
Volume	Liquid	gal	liter	3.785
Temperature	General Use	^oF	^oC	=(tf -32)/1.8
Force	Dynamic Forces	lbf	N	4.448
Moment	Torque	lbf/ft	Nm	1.355

* Based on the Recommended Practice in SAE J916, May 85

DATA SHEET NO. 1

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

TEST VEHICLE INFORMATION AND OPTIONS

NHTSA No.	M70501	Anti-Lock Brakes	Yes
Make	Hyundai	All Wheel Drive	No
Model	Santa Fe SE	Power Steering	Yes
Body Style	5-Door MPV	Driver Front Airbag	Yes
Vin No.	5NMSH13E27H008335	Driver Side Torso Airbag	Yes
Color	Silver	Driver Side Head Airbag	No
Delivery Date	8/21/2006	Driver Curtain/Airbag	Yes
Odometer (Miles)	96	Rear Pass. Airbag	No
Dealer	Glendora Hyundai	Rear Pass. Side Airbag	No
Transmission	5-Speed Automatic	Rear Pass. Head Airbag	No
Final Drive	Front	Rear Pass. Curtain/Airbag	Yes
Type/No. Cyl.	V6	Pre-Tensioners	Yes
Engine Disp. (L)	3.3	Load Limiters	Yes
Engine Placement	Transverse	Bucket Seats	Yes
Roof Rack	Yes	Air Cond.	Yes
Sunroof/T-Top	No	AM/FM CD	Yes
Tinted Glass	Yes	Tilt Steering	Yes
Traction Control	Yes	Automatic Door Locks	No
Power Brakes	Yes	Power Windows	Yes
Front Disc	Yes	Power Seats	No
Rear Disc	Yes	Other	None

Does Owners Manual provide instructions to turn off automatic door locks.	N/A

DATA FROM CERTIFICATION LABEL

Manufactured By	Hyundai Motor Mfg. Alabama, LLC	GVWR (kg)	2320
		GAWR Front (kg)	1350
Date of Manufacture	Jun-06	GAWR Rear (kg)	1450

VEHICLE SEATING AND CAPACITY WEIGHT INFORMATION

Measured Parameter	Front	Rear	Third	Total
Type of Seats	Bucket	Bench	None	
Number of Occupants	2	3		5
Capacity Weight (VCW) (kg)				420
Cargo Weight (RCLW) (kg)				82

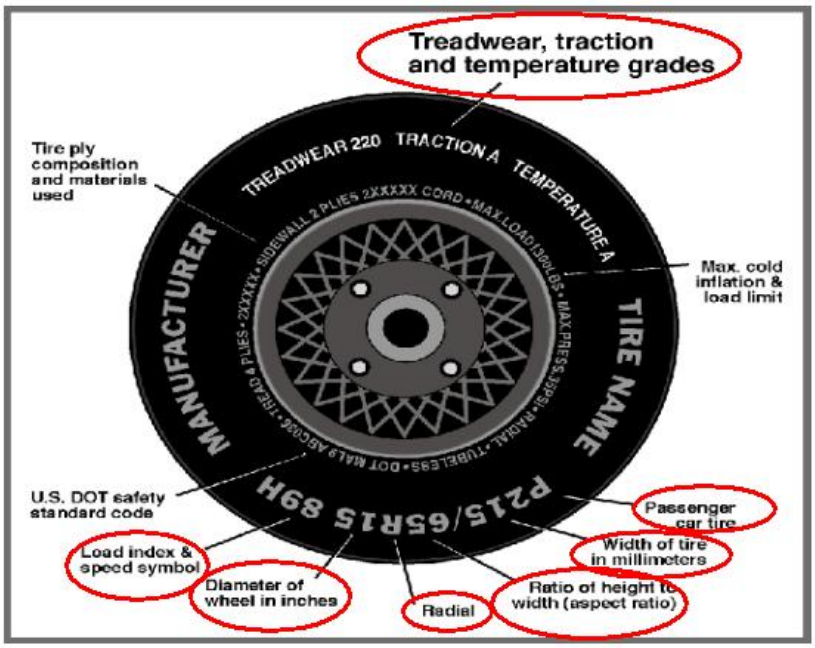
DATA SHEET NO. 1...(CONTINUED)

GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

Collect year, make, model, VIN, items circled in red, and tire manufacturer and tire name.



TIRE INFORMATION

Measured Parameter	Front	Rear
Max. Tire Pressure (kpa)	300	300
Cold Pressure (kpa)	210	210
Recommended Tire Size	P235/60R18	P235/60R18
Tire Size on Vehicle	P235/60R18	P235/60R18
Tire Manufacturer	Bridgestone	Bridgestone
Treadwear	360	360
Traction	B	B
Temperature Grades	B	B
Tire Plies Sidewall	2 Ply Polyester	2 Ply Polyester
Tire Plies Body	2 Polyester + 2 Steel + 1 Nylon	2 Polyester + 2 Steel + 1 Nylon
Load Index/Speed Symbol	684 II	684 II
Tire Material	Polyester + Steel + Nylon	Polyester + Steel + Nylon
DOT Safety Code Right	7X7A 658 2406	7X7A 658 2406
DOT Safety Code Left	7X7A 658 2406	7X7A 658 2406

DATA SHEET NO. 1...(CONTINUED)
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	552	376		616	470	
Right	kg	529	356		549	417	
Ratio	%	59.6	40.4		56.7	43.3	
Totals	kg	1081	732	1813	1165	887	2052

TARGET TEST WEIGHT CALCULATION

Measured Parameter	Units	Value
Total Delivered Weight (UVW)	kg	1813
Weight of 2 P572 ATD's	kg	162
Rated Cargo/Luggage Wt. (RCLW)	kg	82
Calculated Vehicle Target Wt. (TVTW)	kg	2057

TEST VEHICLE ATTITUDE AND CG

	Units	LF	RF	LR	RR	CG (aft of front axle)
As Delivered	mm	824	827	850	864	1093
As Tested	mm	810	806	823	843	1147
Fully Loaded	mm	811	827	820	838	

GENERAL TEST VEHICLE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2705
Total Vehicle Length at Left Side	mm	3067
Total Vehicle Length at Centerline	mm	4671
Total Vehicle Length at Right Side	mm	3067
Weight of Ballast In Cargo Area	kg	0
Amount of Stoddard Solvent in Fuel Tank	liters	69.75

TEST VEHICLE VERTICAL IMPACT LINE DATA

Measurement Description	Units	Value
Test Vehicle Wheel Base	mm	2705
Target Impact Point Aft of Front Axle	mm	413
Actual Impact Point Aft of Front Axle	mm	515

DATA SHEET NO. 1...(CONTINUED)

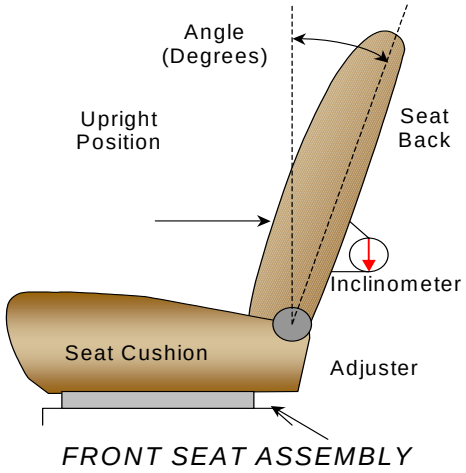
GENERAL TEST AND VEHICLE PARAMETER DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

NOMINAL DESIGN RIDING POSITION

The driver and passenger seat backs are positioned to the manufacturer's designated angle. The procedure is as follows: Seat back angle was measured at the headrest using a digital inclinometer.



FRONT SEAT ASSEMBLY

SEAT BACK ANGLES

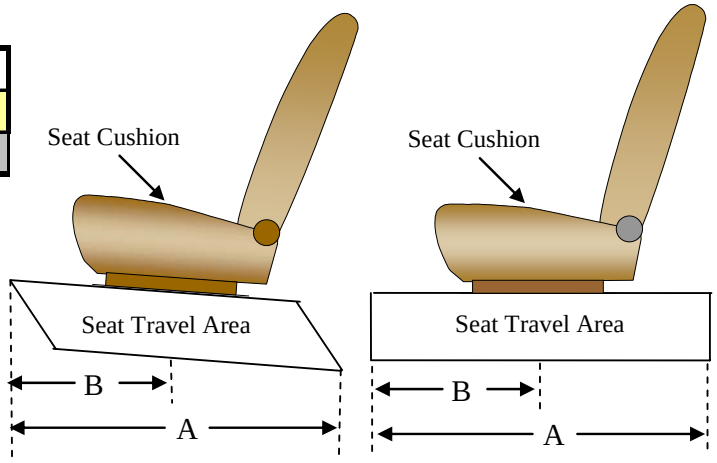
	Deg.
Driver Seat Back Angle	8.8 @ headrest
Rear Seat Back Angle	

SEAT FORE/AFT POSITIONS

The total seat travel was measured from forward most position at the highest vertical seat height to rearmost position at the lowest vertical seat height. The seat was set at the longitudinal mid position with the vertical adjustment at the lowest position obtainable for the driver and passenger.

SEAT FORE/AFT POSITIONING

	Total Fore/Aft Travel	Placed in Position #
Driver Seat	25	13
Rear Seat		



SEAT BELT UPPER ANCHORAGE

Position number one (1) is the uppermost position

SEAT BELT UPPER ANCHORAGE

	Total # of Positions	Placed in Position #
Driver Seat	4	1
Rear Seat	Fixed	Fixed

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

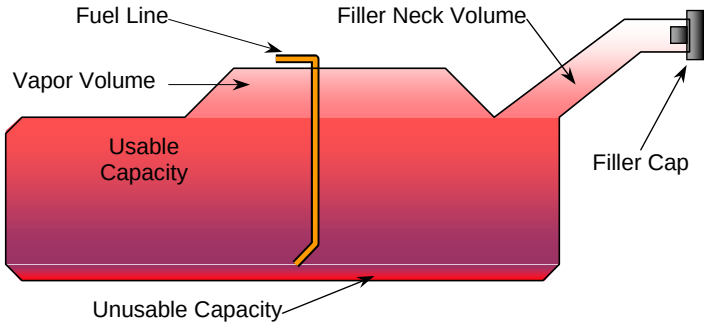
Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

.

FUEL TANK CAPACITY

	Liters
Usable Capacity of "Standard Tank"	74.98
Usable Capacity of "Optional" Tank	
Usable Capacity used for FMVSS 301	69.0 to 70.51
Actual Amount of Solvent used	69.75

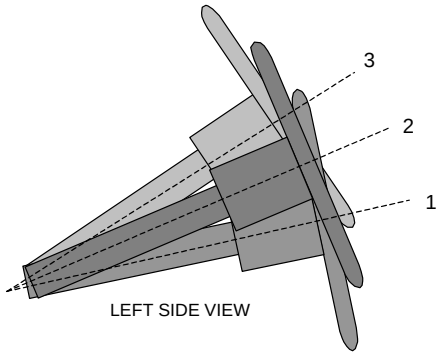
The test vehicle is equipped with an electric fuel pump. The fuel pump will operate for approximately three (3) seconds with the ignition in the "ON" position, after which the fuel pump automatically shuts off. The fuel filler door is located on the left rear fender.



VEHICLE FUEL TANK ASSEMBLY

STEERING COLUMN ADJUSTMENT

Steering wheel and column adjustments are made so that the steering wheel hub is at the geometric center of the locus it describes when moved through its full range of motion. An aluminum plate is placed across the rim of the steering wheel, an inclinometer is placed on the plate and the angle is measured.



STEERING COLUMN ASSEMBLY

STEERING COLUMN POSITIONS

	Degrees	Fore/Aft Position (mm)
Lowermost positon No. 1	22.0	215
Geometric center position No. 2	28.5	230
Uppermost position No. 3	35.5	245

DATA SHEET NO. 2

TEST VEHICLE SUMMARY OF RESULTS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

TEST VEHICLE WEIGHTS

	Units	As Delivered Weights (UVW)			As Tested Weights (ATW)		
		Front Axle	Rear Axle	Total	Front Axle	Rear Axle	Total
Left	kg	552	376		616	470	
Right	kg	529	356		549	417	
Ratio	%	59.6	40.4		56.7	43.3	
Totals	kg	1081	732	1813	1165	887	2052

MAXIMUM EXTERIOR STATIC CRUSH

Level	Measured Parameter	Units	Maximum Crush	Above Ground
Level 1	Sill Top Height	mm	202	335
Level 2	Occupant H-Point	mm	302	752
Level 3	Mid Door	mm	296	778
Level 4	Window Sill	mm	178	1080
Level 5	Window top	mm	55	1618
N/A	Maximum Penetration	mm	302	

INSTRUMENTATION

Driver SID/Hybrid III Accelerometers	20
Passenger SID/Hybrid III Accelerometers	20
Vehicle Structure Accelerometers	21
MDB Accelerometers	5
Total No. of Contact Switches	5
Total	71

CAMERA COVERAGE

High Speed, Vehicle On-Board	3
High Speed, Off-Board	4
High Speed, MDB On-Board	3
Real Time, Panning	2
Total	12

DATA SHEET NO. 3

MOVING DEFORMABLE BARRIER (MDB) SUMMARY OF RESULTS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

MDB SPECIFICATIONS (mm)

Measurement Description	Length
Overall Width of Framework Carriage	1252
Overall Length including Honeycomb Face	4115
Wheel Base of Framework Carriage	2590
C.G. location aft of Front Axle	1127

MDB WEIGHTS

	Units	Front Axle	Rear Axle	Total
Left	kg	384	308	
Right	kg	385	284	
Ratio	%	56.5	43.5	
Totals	kg	769	592	1361

SPEED AND IMPACT DATA

Measured Parameter	Units	Requirement	Value
Trap No. 1 Velocity (Primary)	km/h	61.1 to 62.7	61.94
Trap No. 2 Velocity (Redundant)	km/h	61.1 to 62.7	61.90
MDB CL to Target Vehicle CL	degrees	88.5 to 91.5	89.5

MAXIMUM STATIC CRUSH OF HONEYCOMB FACE (mm)

Vertical Location			From Centerline		Max. Crush
Row	Description	Height	Distance	Direction	
A	Center of Bumper	432	800	Left	674
B	Top of Bumper	533	700	Left	699
C	Mid Level	686	800	Left	682
D	Top of Stack	813	800	Left	746

MDB INSTRUMENTATION AND CAMERAS

Accelerometers	5
Contact Switches	1
High Speed Cameras	2

DATA SHEET NO. 4

POST-TEST OBSERVATIONS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

TEST DUMMY INFORMATION AND CONTACT POINTS

Description	Front Seat SID/Hybrid III	Rear Seat SID/Hybrid III
Dummy Type / Serial No.	P572F, SID / No. 274	P572F, SID / No. 275
Head Contact	Curtain Airbag	Curtain Airbag & Side Header
Upper Torso Contact	Side Airbag	Door Panel
Lower Torso Contact	Side Airbag	Door Panel
Left Knee Contact	Door Panel	Door Panel
Right Knee Contact	Left Knee	Left Knee

POST-TEST DOOR OPENING AND SEAT TRACK INFORMATION

Description	Front	Rear
Left Side Door Opening	Door remained closed and latched, jammed	Door remained closed and latched, jammed
Right Side Door Opening	Remained closed and latched, operational	Remained closed and latched, operational
Seat Movement	None	None
Seat Back Failure	None	None

POST-TEST STRUCTURAL OBSERVATIONS

Critical Areas of Performance	Observations and Conclusions
Pillar Performance	No separation
Sill Separation	Front & Rear passenger side sill separated
Windshield Damage	None
Window Damage	None
Other Notable Effects	None

SUPPLEMENTAL RESTRAINT SYSTEM INFORMATION

Restraint Type	Left Front (Driver) Occupant Location 01		Left Rear (Passenger) Occupant Location 04	
	Installed	Operation	Installed	Operation
Front Airbag	Yes	No	No	
Side Torso Airbag	Yes	Yes	No	
Head Airbag	No		No	
Curtain Airbag	Yes	Yes	Yes	Yes
Seat Belt Pretensioner	Yes		No	
Seat Belt Load Limiter	Yes		No	

MDB LEFT EDGE IMPACT POINT DATA

Measured Parameter	Units	Requirement	Value
Horizontal Offset	mm	+/- 50	-30 (left)
Vertical Offset	mm	+/- 20	-1 (below)

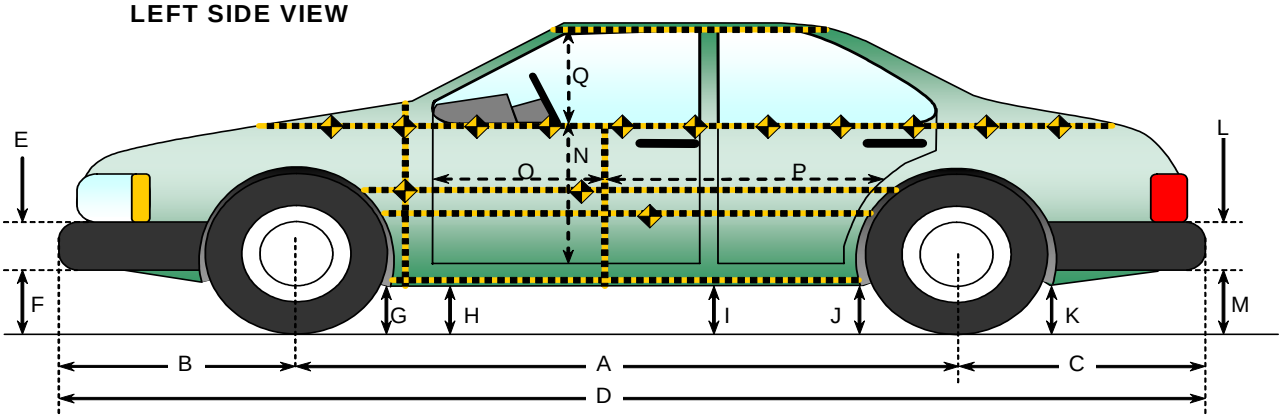
DATA SHEET NO. 5

VEHICLE PRE-TEST AND POST-TEST MEASUREMENTS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

LEFT SIDE VIEW



VEHICLE PRE AND POST-TEST MEASUREMENT INFORMATION

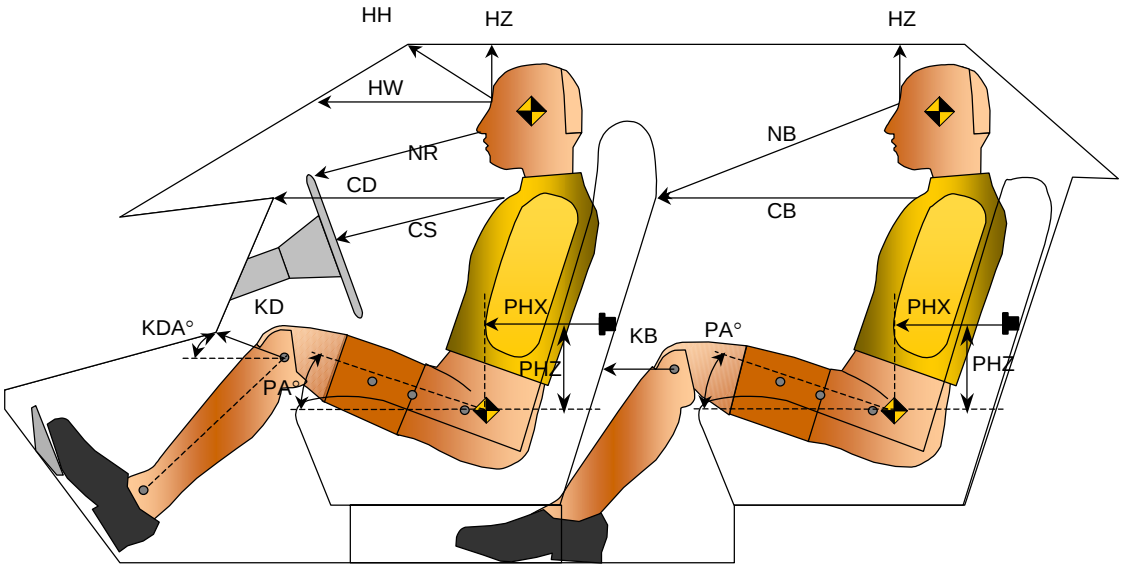
Code	Measurement Description	Pre-Test	Post-Test	Difference
A	Wheelbase	2705	2760	55
B	Front Axle to FSOV	942	946	4
C	Rear Axle to RSOV	1033	1055	22
D	Total Length at Centerline	4671	4665	-6
E	Front Bumper Thickness	445	445	0
F	Front Bumper Bottom to Ground	291	299	8
G	Sill Height at Front Wheel Well	284	301	17
H	Sill Height at Front Door Leading Edge	288	301	13
I	Sill Height at "B" Pillar	296	322	26
J1	Sill Height at Rear Wheel Well	280	308	28
J2	Pinch Weld Height at Rear Wheel Well	306	351	45
K	Sill Height aft of Rear Wheel Well	336	386	50
L	Rear Bumper Thickness	330	330	0
M	Rear Bumper Bottom to Ground	393	459	66
N	Sill Height to Window Bottom Sill	740	695	-45
O	Front Door Leading Edge to Impact CL	740	730	-10
P	Rear Door Trailing Edge to Impact CL	1362	1373	11
Q	Front Window Opening	432	430	-2
R	Right Side Length	3067	3070	3
S	Left Side Length	3067	3015	-52
T	Vehicle Width at "B" Post	1580	1685	105

DATA SHEET NO. 6

SID/HIII LONGITUDINAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



LONGITUDINAL CLEARANCE DIMENSION INFORMATION

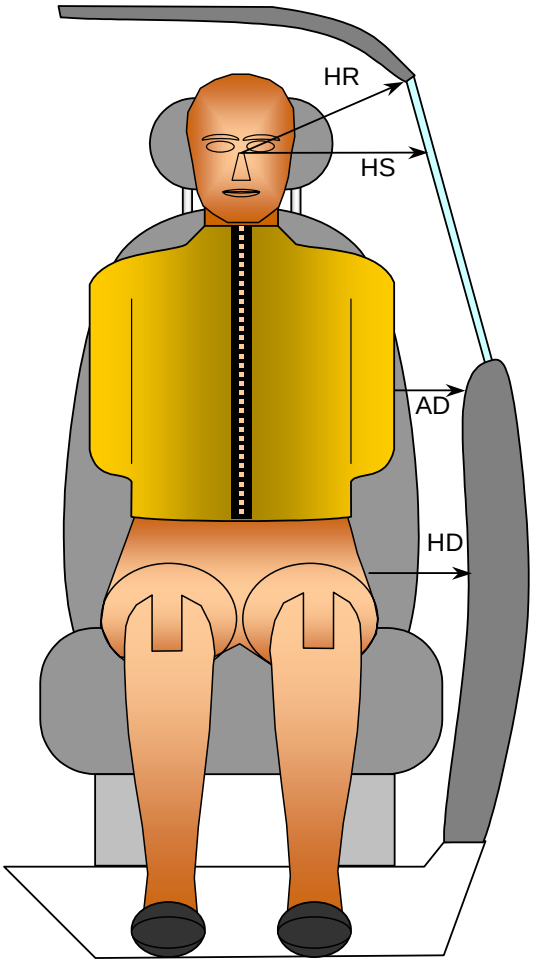
Driver Code	Pass. Code	Measurement Description	Driver		Passenger	
			Length(mm)	Angle	Length(mm)	Angle
HH		Head to Header	340	18.3		
HW		Head to Windshield	513	0.0		
HZ	HZ	Head to Roof	165	90.0	200	90.0
NR	NB	Nose to Rim/Nose to Seat Back	420	14.3	660	24.9
CD	CB	Chest to Dash or Seat Back	630	1.7	561	5.6
CS		Chest to Steering Wheel	335	8.5		
KDL	KBL	Left Knee to Dash or Seat Back	160	2.1	248	4.0
KDR	KBR	Right Knee to Dash or Seat Back	156		251	
PA	PA	Pelvic Angle		23.7		24.7
PHX	PHX	H-Point to Striker (X-Axis)	320	0.0	320	0.0
PHZ	PHZ	H-Point to Striker (Z-Axis)	175	0.0	195	0.0

DATA SHEET NO. 7

SID/HIII LATERAL CLEARANCE DIMENSIONS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



FRONT VIEW OF DUMMY

LATERAL CLEARANCE DIMENSION INFORMATION

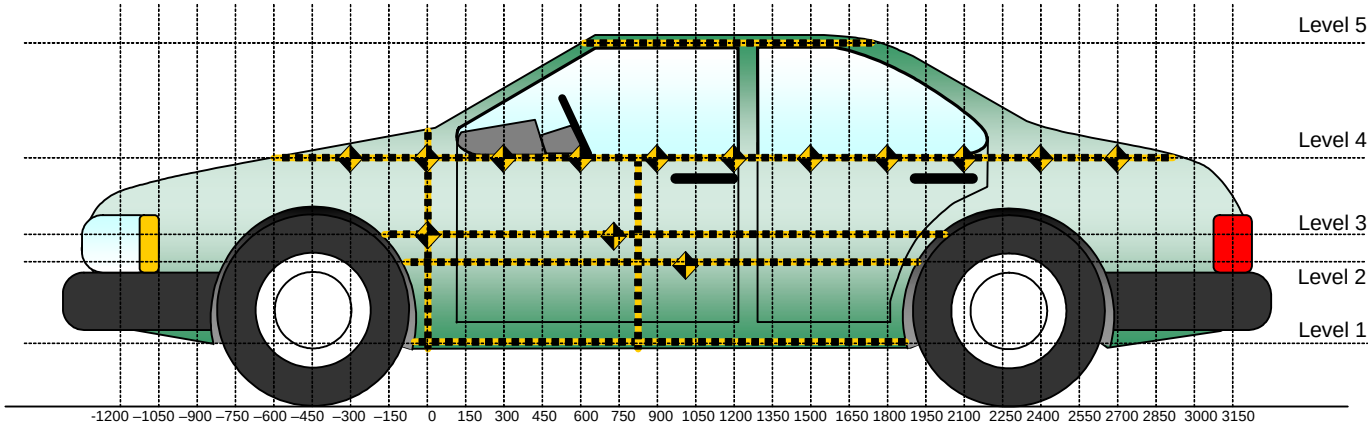
Code	Measurement Description	Units	Driver	Passenger
HR	Head to Side Header	mm	300	290
HS	Head to Side Window	mm	340	320
AD	Arm to Door	mm	122	120
HD	H-Point to Door	mm	218	172

DATA SHEET NO. 8

VEHICLE SIDE MEASUREMENTS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



All Measurements Shown in mm

LEFT SIDE VIEW

Level	Measurement Description	Height Above Ground
1	Sill Top	335
2	Occupant H-Point	752
3	Mid Door	778
4	Window Sill	1080
5	Window Top	1618

DATA SHEET NO. 9

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

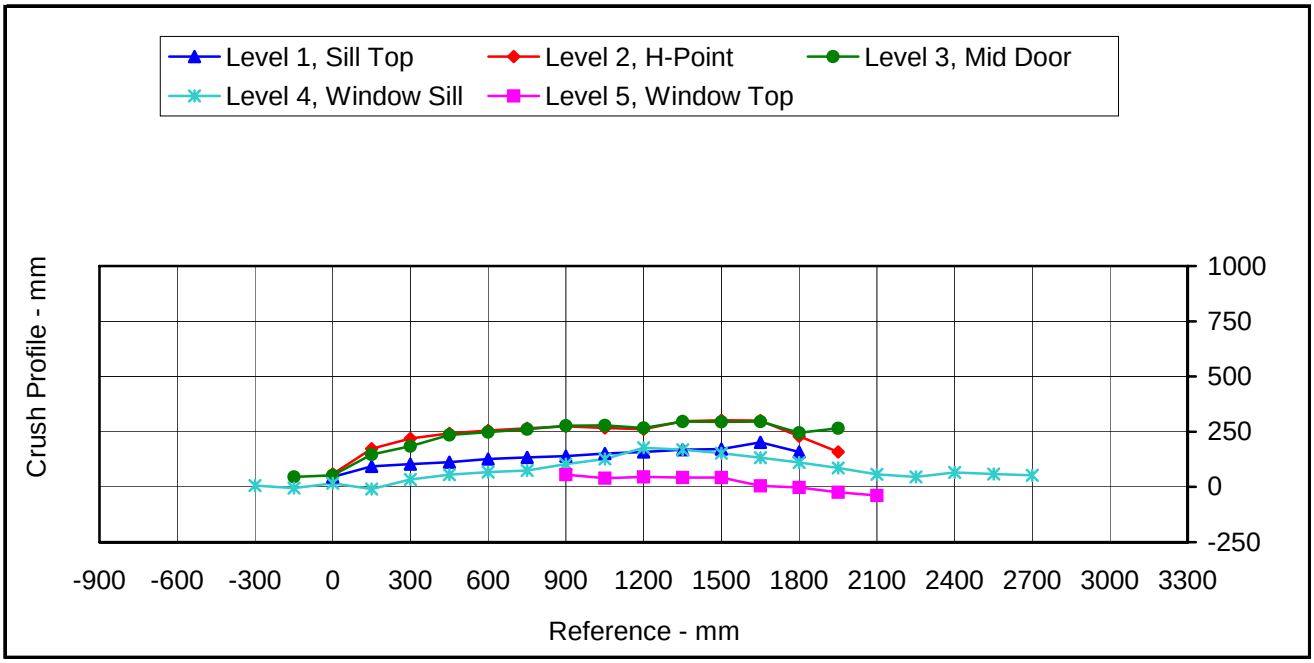
	Pre-Test					Post-Test					Difference				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
-900															
-750															
-600															
-450				696					696					0	
-300			566	691				596	698				30	7	
-150		562	562	691			603	608	686			41	46	-5	
0	616	568	571	662		662	626	623	678		46	58	52	16	
150	616	573	572	658		709	746	719	649		93	173	147	-9	
300	616	572	572	650		719	792	757	684		103	220	185	34	
450	618	573	573	636		730	816	808	691		112	243	235	55	
600	616	575	574	631		742	830	822	698		126	255	248	67	
750	618	576	574	631		752	842	836	706		134	266	262	75	
900	621	576	574	616	861	761	851	851	719	916	140	275	277	103	55
1050	621	576	574	608	841	772	843	853	734	881	151	267	279	126	40
1200	620	575	573	606	841	779	837	840	784	886	159	262	267	178	45
1350	621	575	573	600	839	789	873	869	769	881	168	298	296	169	42
1500	626	576	574	596	836	798	878	869	749	879	172	302	295	153	43
1650	621	572	571	591	836	823	872	867	723	841	202	300	296	132	5
1800	621	570	568	585	836	779	799	814	696	833	158	229	246	111	-3
1950		556	558	581	838		714	823	667	814		158	265	86	-24
2100		550	550	580	840		668	664	637	801		118	114	57	-39
2250			550	576				640	621				90	45	
2400			556	591				628	657				72	66	
2550			561	596				611	655				50	59	
2700				601					654					53	
2850				616					656					40	
3000															

DATA SHEET NO. 9…(CONTINUED)

VEHICLE EXTERIOR CRUSH PROFILES

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



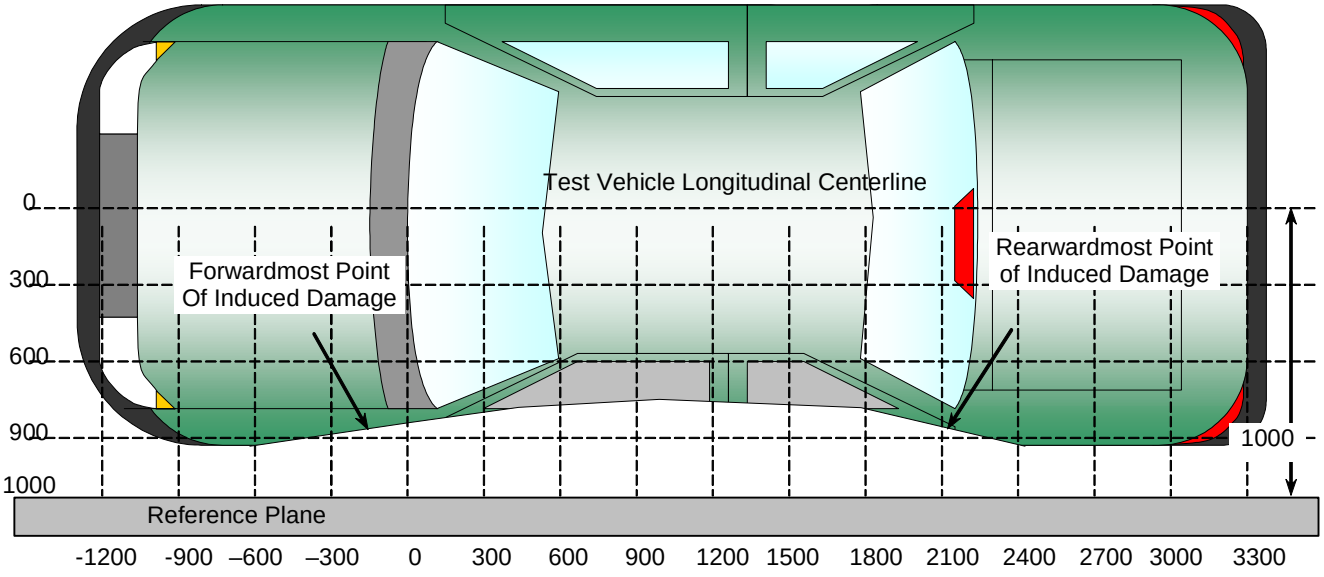
	Units	Level 1	Level 2	Level 3	Level 4	Level 5
Maximum Crush	mm	202	302	296	178	55
Distance from Impact	mm	1650	1500	1350	1200	900

DATA SHEET NO. 10

VEHICLE DAMAGE PROFILE DISTANCES

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



All Dimensions Shown in millimeters

TOP VIEW

DAMAGE PROFILE DISTANCES

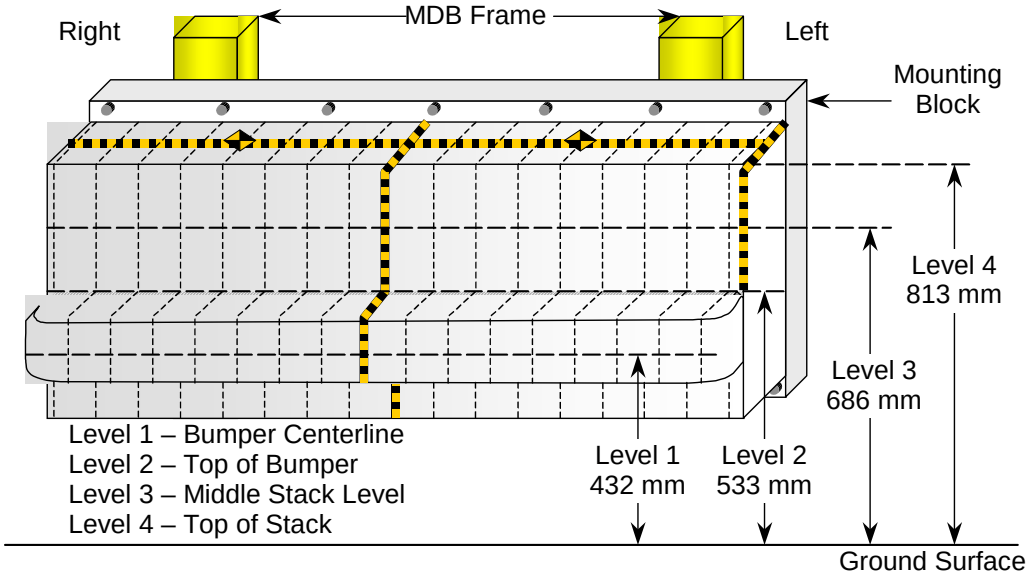
DPD	Distance From Impact Point in mm	Level	Pre-Test (mm)	Post-Test (mm)	Max. Static Crush (mm)
1	-450	4	696	696	0
2	150	2	573	746	173
3	750	2	576	842	266
4	1350	2	575	873	298
5	2100	2	550	668	118
6	2850	4	616	656	40

DATA SHEET NO. 11

DEFORMABLE BARRIER HONEYCOMB FACE STATIC CRUSH

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



DEFORMABLE BARRIER STATIC CRUSH

Stack Level	Distance Right of Center								C/L	Distance Left of Center							
	800	700	600	500	400	300	200	100	0	100	200	300	400	500	600	700	800
1	634	617	609	608	609	612	616	619	620	627	631	633	639	636	647	653	674
2	666	657	653	650	645	640	641	645	648	659	668	673	681	687	692	699	691
3	631	610	600	83	592	597	606	595	592	595	596	600	607	616	628	656	682
4	656	620	602	605	596	624	609	591	594	601	611	621	623	632	645	676	746

All Dimensions in mm

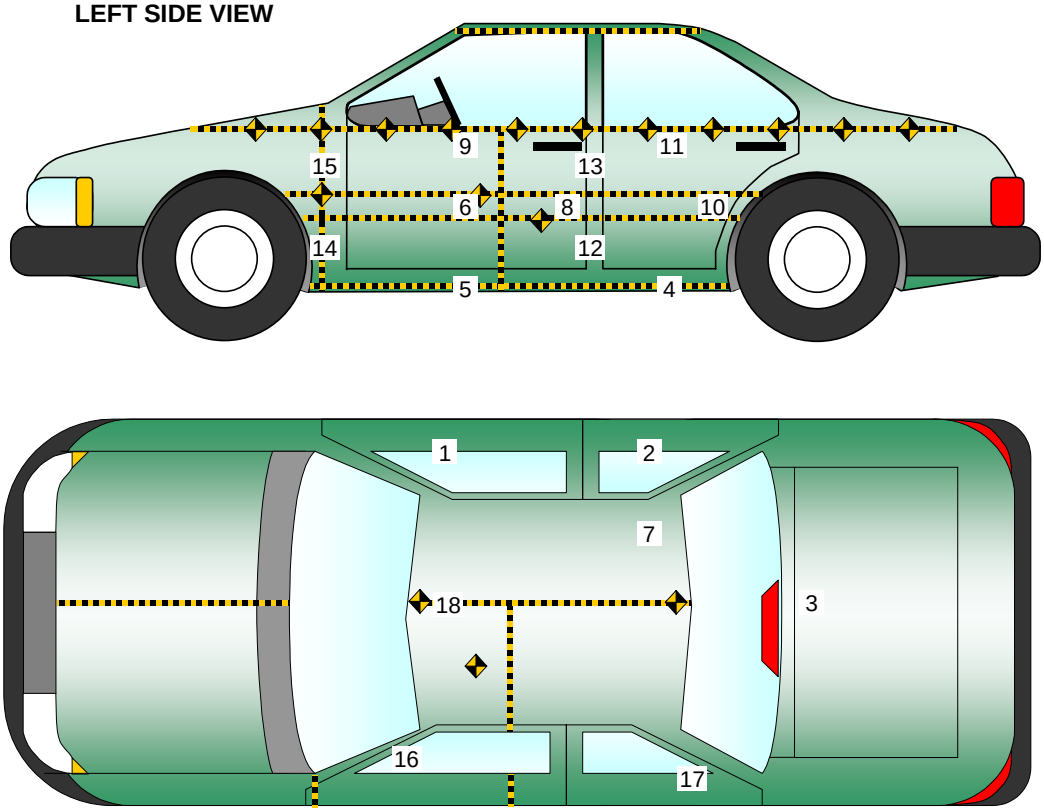
DATA SHEET NO. 12

VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

LEFT SIDE VIEW



No.	Location
1	Right Sill at Front Seat
2	Right Sill at Rear Seat
3	Rear Floorpan Above Axle
4	Left Sill at Rear Door
5	Left Sill at Front Door
6	Left Front Door Centerline
7	Right Rear Occupant Compartment
8	Left Front Door Mid-Rear
9	Left Front Door Upper Centerline

No.	Location
10	Left Rear Door Mid-Rear
11	Left Rear Door Upper Centerline
12	Left Lower B-Post
13	Left Middle B-Post
14	Left Lower A-Post
15	Left Middle A-Post
16	Front Seat Track
17	Rear Seat Track or Structure
18	Vehicle CG

DATA SHEET NO. 12…(CONTINUED)
VEHICLE ACCELEROMETER LOCATIONS

Test Vehicle: 2007 Hyundai Santa FE SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

VEHICLE ACCELEROMETER PRE-TEST LOCATIONS

Loc. No.	Accelerometer Location	Measurements (mm)			
		X	Y	Z	
1	Right Sill at Front Seat	2780	783	501	
2	Right Sill at Rear Seat	1798	783	501	
3	Rear Floorpan Above Axle	1032	0	590	
4	Left Sill at Rear Door	1732	-745	263	
5	Left Sill at Front Door	2295	-745	263	
6	Front Door Centerline				1
7	Rt. Rear Occ. Compartment	2075	249	405	
8	Front Door Mid-Rear				1
9	Front Door Upper Centerline				1
10	Rear Door Mid-Rear				1
11	Rear Door Upper Centerline				1
12	B-Post Lower	2099	-744	778	
13	B-Post Middle	2099	-744	1082	
14	A-Post Lower	3166	-820	698	
15	A-Post Middle	3166	-820	865	
16	Front Seat Track	2503	-578	526	
17	Rear Seat Structure				1
18	Vehicle CG	2779	244	405	

Reference Planes: X=From Rear Surface of Vehicle, Y=Vehicle Centerline, Z=Ground Plane

1.) Not installed

DATA SHEET NO. 13

MDB ACCELEROMETER LOCATIONS

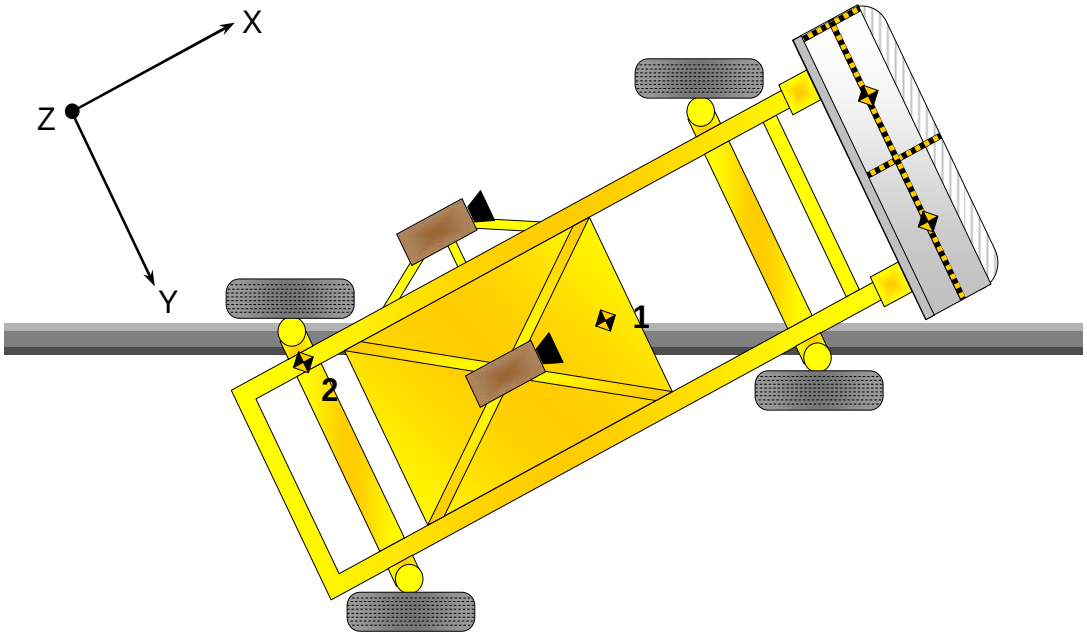
Test Vehicle: 2007 Hyundai Santa FE SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

MDB ACCELEROMETER LOCATIONS

Loc. No.	Accelerometer Locations	Measurements (mm)		
		X	Y	Z
1	MDB CG	-1195	0	430
2	MDB Rear	-2642	-593	608

Reference Points: X - MDB Front Axle
Y - MDB Centerline
Z - Ground Plane

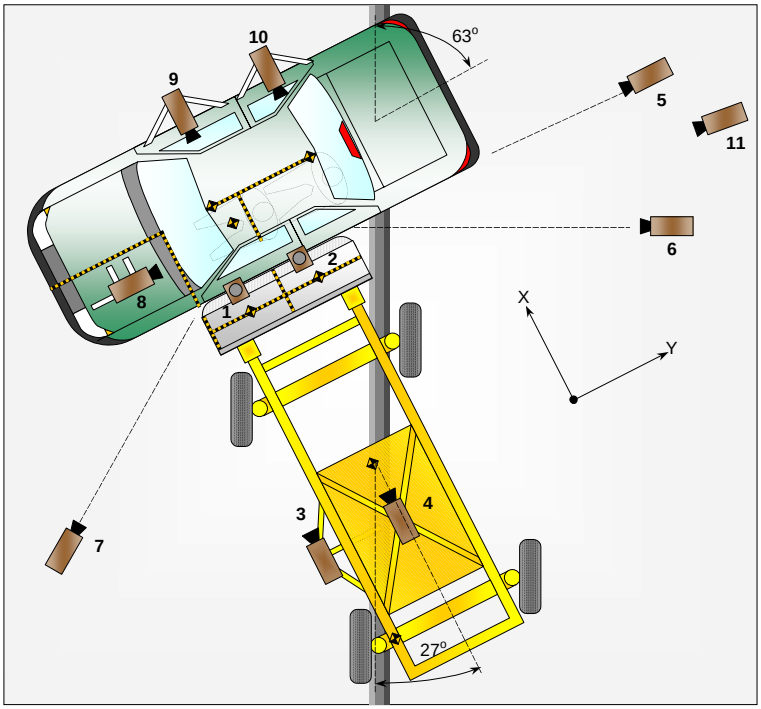


DATA SHEET NO. 14

HIGH SPEED CAMERA LOCATIONS AND DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06



No.	Camera View	Location			Angle (Deg.)	Lens (mm)	Speed (fps)
		X	Y	Z			
DOC	REAL TIME DIGITAL	-7239	16851	-1806	-2	N/A	30
1	OVERHEAD OVERALL	1224	2281	-5484	-90	14mm	1000
2	OVERHEAD CLOSE UP	612	2286	-5452	-90	ZOOM	1000
3	LEFT IMPACT POINT (MDB)	-2124	0	-1137	-7	25mm	1000
4	SIDE OVERALL (MDB)	-3912	838	-1829	-11	12mm	1000
5	REAR	-287	14845	-1334	0	ZOOM	1000
6	LEFT REAR	-7184	16548	-839	0	ZOOM	1000
7	LEFT FRONT	-2675	3554	-1567	-4	24mm	1000
8	DRIVER FRONT (O.B.)	524	-257	-1294	-15	35mm	1000
9	DRIVER SIDE (O.B.)	2014	347	-1236	-2	20mm	1000
10	PASSENGER SIDE (O.B.)	2014	858	-1257	-2	20mm	1000
11	INLINE	45720	21336	-1201	0	85mm	30
AV 1	LEFT REAR (MDB)	-2137	1302	-939	-4	25mm	1000
DOC	REAL TIME DIGITAL	261	15559	-1364	0	N/A	30

All camera measurements were made relative to the point of impact.

DATA SHEET NO. 15

FMVSS 301 FUEL SYSTEM INTEGRITY POST-IMPACT DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

Test Time: 1:44 PM Temperature: 33.7 Deg. C.

Stoddard Solvent Spillage Measurements

A. From impact until vehicle motion ceases: 0.0* oz.
(Maximum Allowable = 1 ounce)

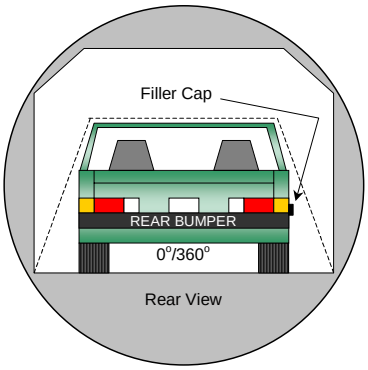
B. For the 5 minute period after motion ceases: 0.0* oz.
(Maximum Allowable = 5 ounces)

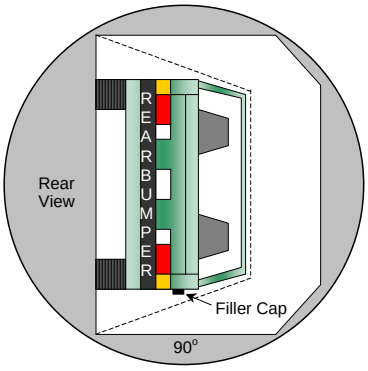
C. For the following 25 minutes: 0.0* oz.
(Maximum Allowable = 1 oz./minute)

D. Spillage Details: * Trace amounts of solvent leaked from the filler neck.
This Amount could not be measured.

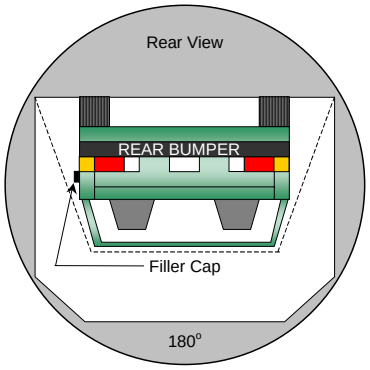
DATA SHEET NO. 16
FMVSS 301 STATIC ROLLOVER DATA

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501
Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

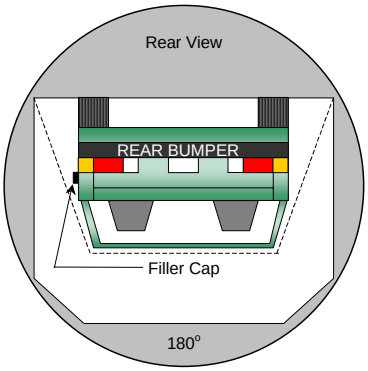




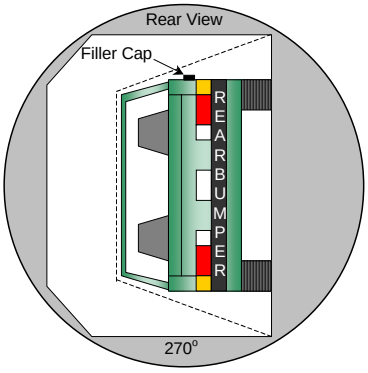
0° to 90°

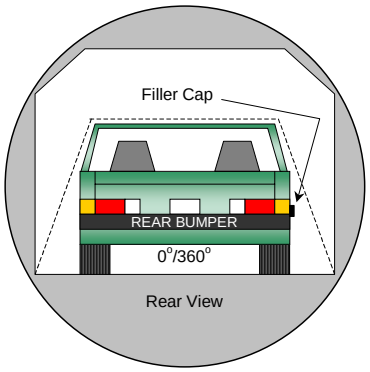


90° to 180°



180° to 270°





270° to 360°

1. The specified fixture rollover rate for each 90° of rotation is 60 to 120 seconds.
2. The position hold time at each position is 300 seconds (minimum).
3. Details of Stoddard Solvent spillage locations.

DATA SHEET NO. 16…(CONTINUED)

FMVSS 301 STATIC ROLLOVER DATA SHEET

Test Vehicle: 2007 Hyundai Santa Fe SE 5-Door MPV NHTSA No.: M70501

Test Program: 55/28 km/h Side Impact NCAP Test Date: 8/28/06

SOLVENT COLLECTION TIME TABLE IN SECONDS

Test Phase	Rotation Time	Hold Time	Total Time
0° to 90°	80	300	380
90° to 180°	83	300	383
180° to 270°	78	300	378
270° to 360°	78	300	378

FMVSS 301 SPILLAGE TABLE REQUIREMENT (oz.)

First 5 Minutes	5.0
Sixth Minute	1.0
Seventh Minute	1.0
Eighth Minute	1.0

Test Phase	First 5 Minutes	Sixth Minute	Seventh Minute	Eighth Minute
0° to 90°	0.07 oz.	0*	0*	0*
90° to 180°	0	0	0	0
180° to 270°	0	0	0	0
270° to 360°	0	0	0	0

* Trace amounts were collected but could not be measured.

SOLVENT SPILLAGE LOCATION TABLE

Test Phase	Spillage Location
0° to 90°	Filler Neck
90° to 180°	None
180° to 270°	None
270° to 360°	None

APPENDIX A
PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Figure A-1: Left Front ¾ View, as Received

Figure A-2: Right Rear ¾ View, as Received

Figure A-3: Manufacturer's Label

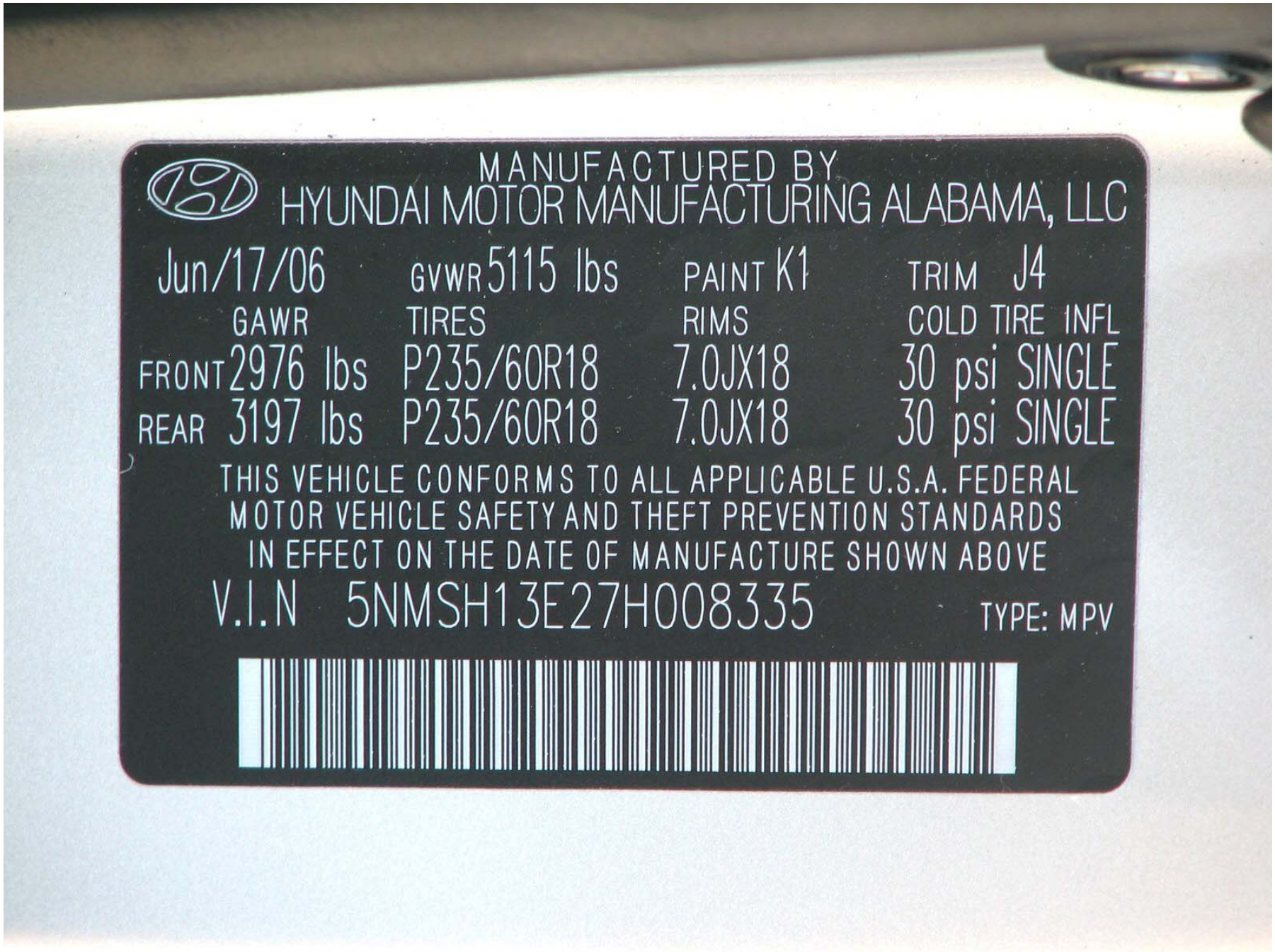


Figure A-4: Tire Placard

Figure A-5: Pre-Test Front View

Figure A-6: Post-Test Front View

Figure A-7: Pre-Test Left Front ¾ View

Figure A-8: Post-Test Left Front ¾ View

Figure A-9: Pre-Test Left Side View

Figure A-10: Post-Test Left Side View

Figure A-11: Pre-Test Left Rear ¾ View

Figure A-12: Post-Test Left Rear ¾ View

Figure A-13: Pre-Test Rear View

Figure A-14: Post-Test Rear View

Figure A-15: Pre-Test Right Rear ¾ View

Figure A-16: Post-Test Right Rear ¾ View

Figure A-17: Pre-Test Right Side View

Figure A-18: Post-Test Right Side View

Figure A-19: Pre-Test Right Front ¾ View

Figure A-20: Post-Test Right Front ¾ View

Figure A-21: Pre-Test Overhead View

Figure A-22: Post-Test Overhead View

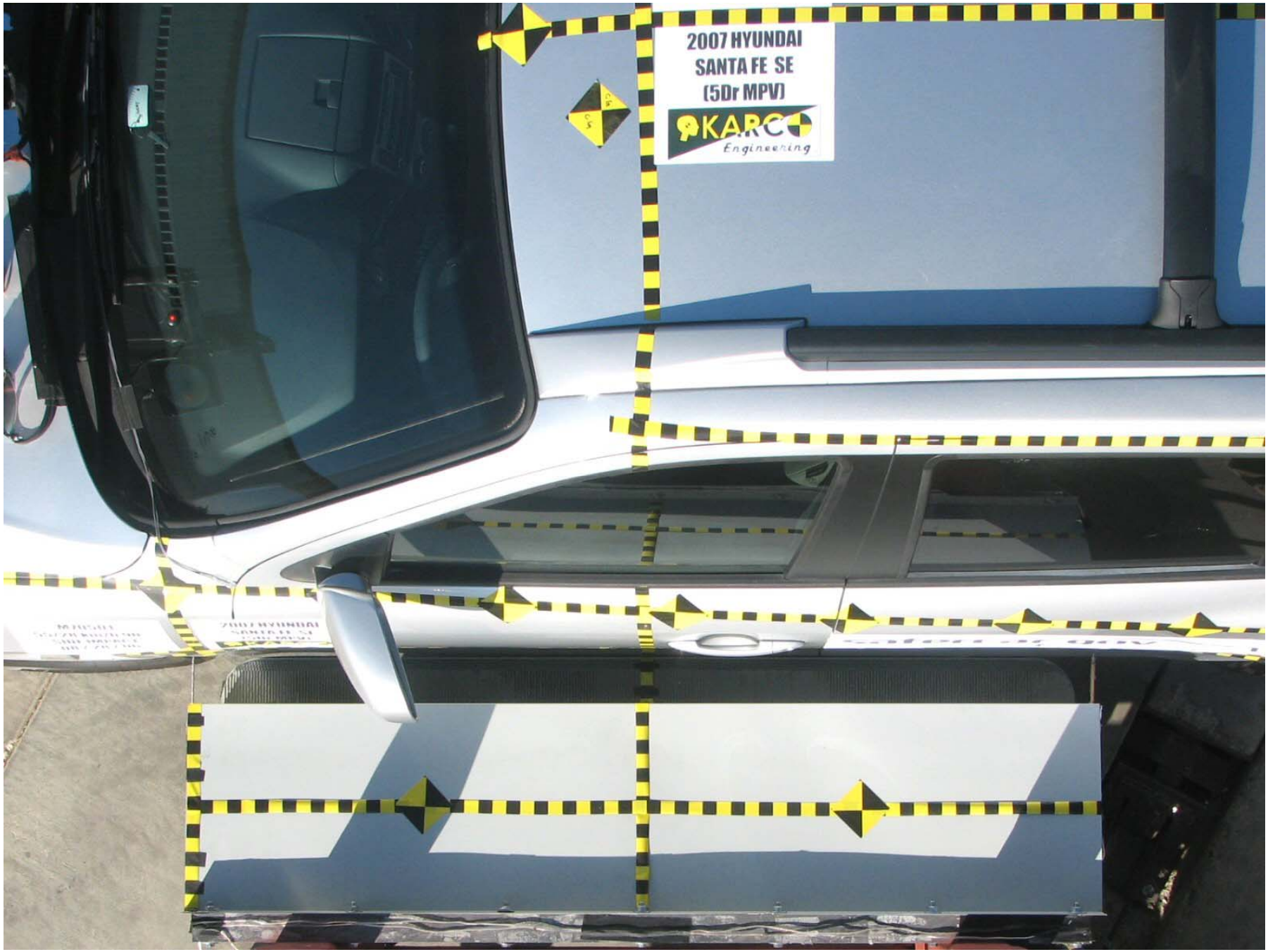


Figure A-23: Pre-Test Overhead Close-up View

Figure A-24: Post-Test Overhead Close-up View

Figure A-25: Pre-Test Left Impact Point

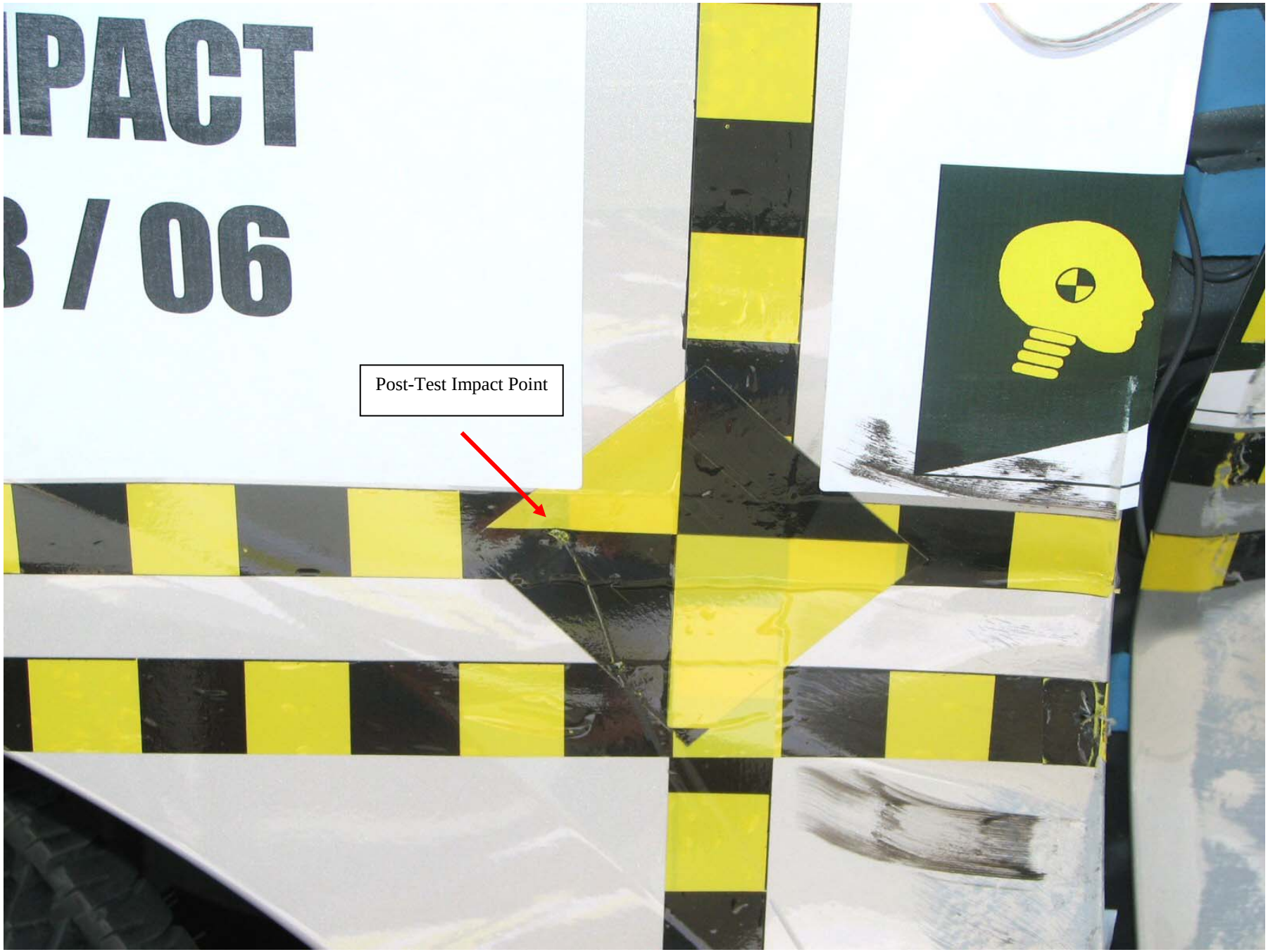


Figure A-26: Post-Test Left Impact Point

Figure A-27: Pre-Test Front ¾ View of Left Side Door

Figure A-28: Post-Test Front ¾ View of Left Side Door

Figure A-29: Pre-Test Rear ¾ View of Left Side Door

Figure A-30: Post-Test Rear ¾ View of Left Side Door

Figure A-31: Pre-Test Left Front Door

Figure A-32: Post-Test Left Front Door

Figure A-33: Pre-Test Left Rear Door

Figure A-34: Post-Test Left Rear Door

Figure A-35: Pre-Test Driver Dummy (Door Open)

Figure A-36: Pre-Test Driver Dummy (Through Window)

Figure A-37: Post-Test Driver Dummy (Through Window)

Figure A-38: Pre-Test Driver Dummy Clearance From Door

Figure A-39: Post-Test Driver Dummy Clearance From Door

Figure A-40: Pre-Test Driver Dummy Right Side View

Figure A-41: Post-Test Driver Dummy Right Side View

Figure A-42: Pre-Test Front Door Panel (Interior)

Figure A-43: Post-Test Front Door Panel (Interior)

Figure A-44: Pre-Test Passenger Dummy Left Side (Door Open)

Figure A-45: Pre-Test Passenger Dummy Left Side (Through Window)

Figure A-46: Post-Test Passenger Dummy Left Side (Through Window)

Figure A-47: Pre-Test Passenger Dummy Clearance From Door

Figure A-48: Post-Test Passenger Dummy Clearance From Door

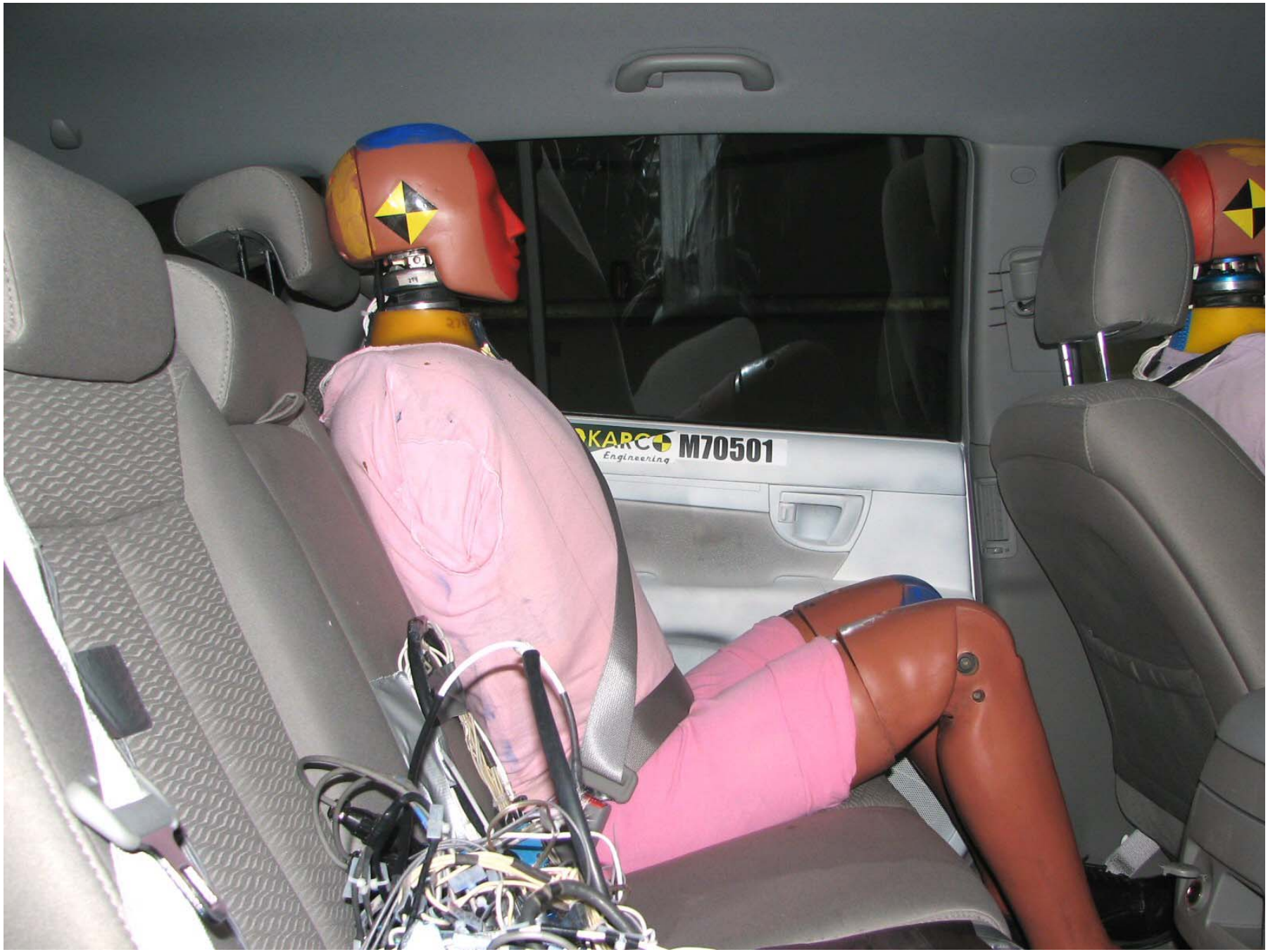


Figure A-49: Pre-Test Passenger Dummy Right Side View

Figure A-50: Post-Test Passenger Dummy Right Side View

Figure A-51: Pre-Test Rear Door Panel (Interior)

Figure A-52: Post-Test Rear Door Panel (Interior)

Figure A-53: Pre-Test Front View of Deformable Barrier

Figure A-54: Post-Test Front View of Deformable Barrier

Figure A-55: Pre-Test Top View of Deformable Barrier

Figure A-56: Post-Test Top View of Deformable Barrier

Figure A-57: Pre-Test Right Side View of Deformable Barrier

Figure A-58: Post-Test Right Side View of Deformable Barrier

Figure A-59: Pre-Test Left Side View of Deformable Barrier

Figure A-60: Post-Test Left Side View of Deformable Barrier

Figure A-61: Vehicle on Rollover Device (0°)

Figure A-62: Vehicle on Rollover Device (90°)

Figure A-63: Vehicle on Rollover Device (180°)

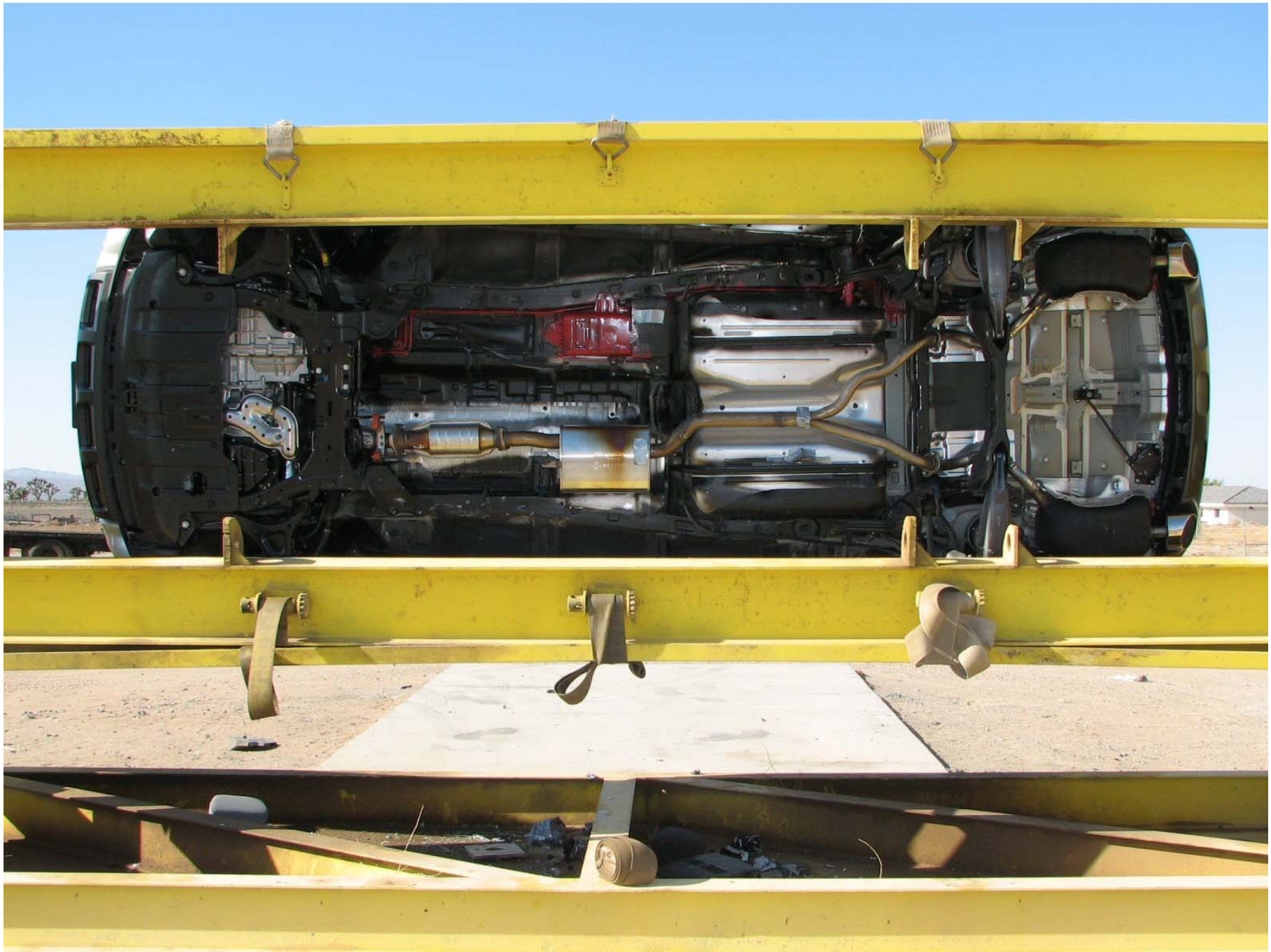


Figure A-64: Vehicle on Rollover Device (270°)

Figure A-65: Vehicle Impact

APPENDIX B

SID/HIII, VEHICLE AND MDB RESPONSE DATA

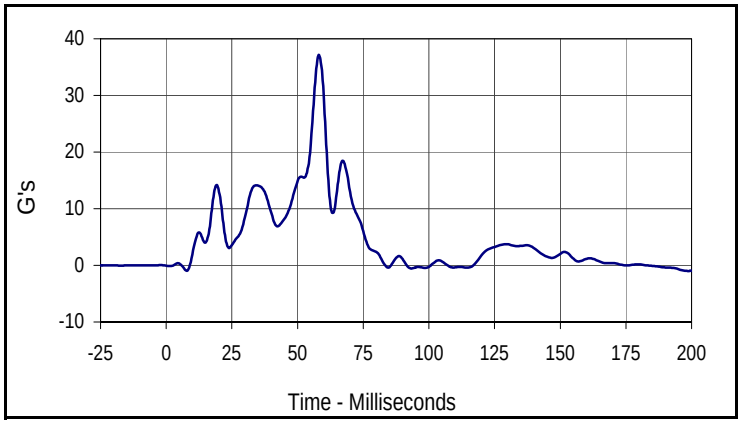
LIST OF DATA PLOTS

The following additional data plots for this test can be obtained from the research and development section of the NHTSA website. The website can be found at www.NHTSA.dot.gov

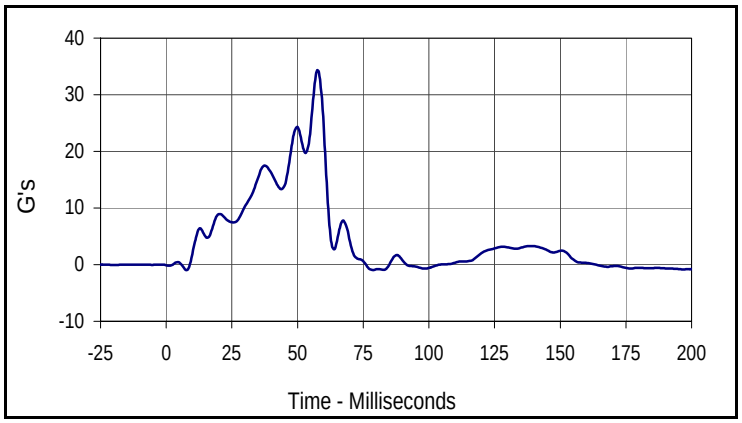
LIST OF DATA PLOTS…(CONTINUED)

Driver Head X Primary
Driver Head Y Primary
Driver Head Z Primary
Driver Head Resultant Primary
Driver Head Primary X Velocity
Driver Head Primary Y Velocity
Driver Head Primary Z Velocity
Driver Head X Redundant
Driver Head Y Redundant
Driver Head Z Redundant
Driver Head Resultant Redundant
Driver Head Redundant X Velocity
Driver Head Redundant Y Velocity
Driver Head Redundant Z Velocity
Driver Upper Neck Force X
Driver Upper Neck Force Y
Driver Upper Neck Force Z
Driver Upper Neck Force Resultant
Driver Upper Neck Moment X
Driver Upper Neck Moment Y
Driver Upper Neck Moment Z
Driver Upper Neck Moment Resultant
Driver Upper Rib Primary Y Velocity
Driver Lower Rib Primary Y Velocity
Driver Lower Spine Primary Y Velocity
Driver Pelvis Primary Y Velocity
Driver Upper Rib Redundant Y
Driver Lower Rib Redundant Y
Driver Lower Spine Redundant Y
Driver Pelvis Redundant Y

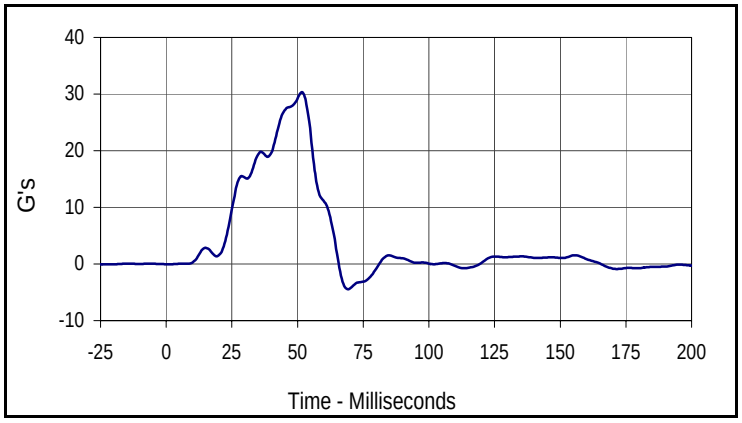
Test Vehicle:	2007 Hyundai Santa FE SE 5-Door MPV	Test Date:	8/28/06
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	M70501



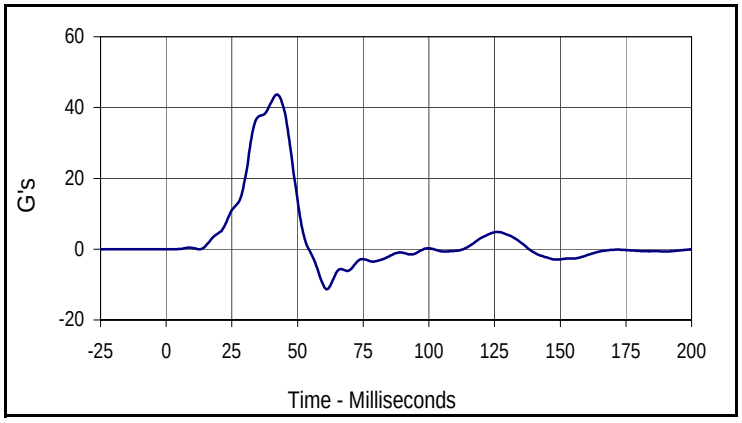
Curve Description			
Driver Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
001	FIR	FIR100	G's
Max	Time	Min	Time
37.2	58.1	-1.0	198.8



Curve Description			
Driver Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
002	FIR	FIR100	G's
Max	Time	Min	Time
34.4	57.5	-1.0	7.5

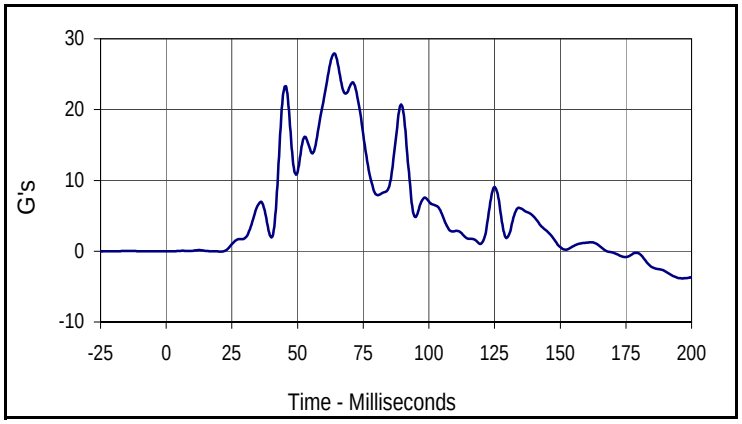


Curve Description			
Driver Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
003	FIR	FIR100	G's
Max	Time	Min	Time
30.3	51.9	-4.5	69.4

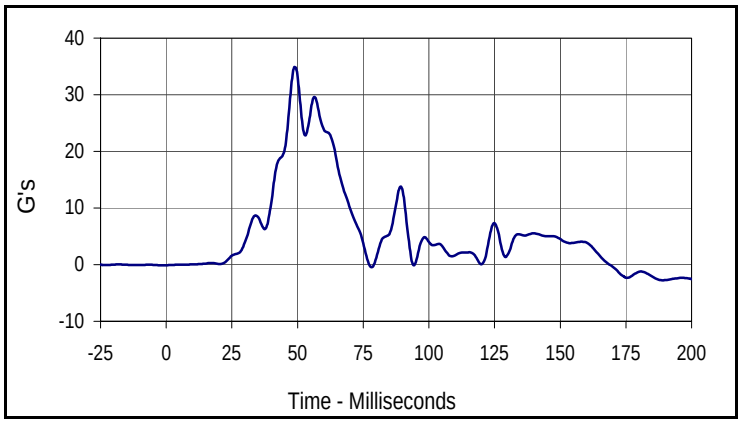


Curve Description			
Driver Pelvis Primary Y			
CURNO	Type	SAE Class	Units
004	FIR	FIR100	G's
Max	Time	Min	Time
43.6	42.5	-11.3	61.3

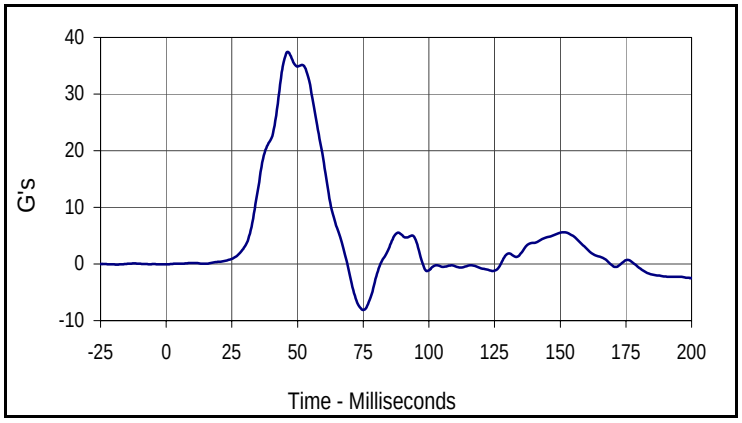
Test Vehicle:	2007 Hyundai Santa FE SE 5-Door MPV	Test Date:	8/28/06
Test Program:	55/28 km/h Side Impact NCAP	NHTSA No.:	M70501



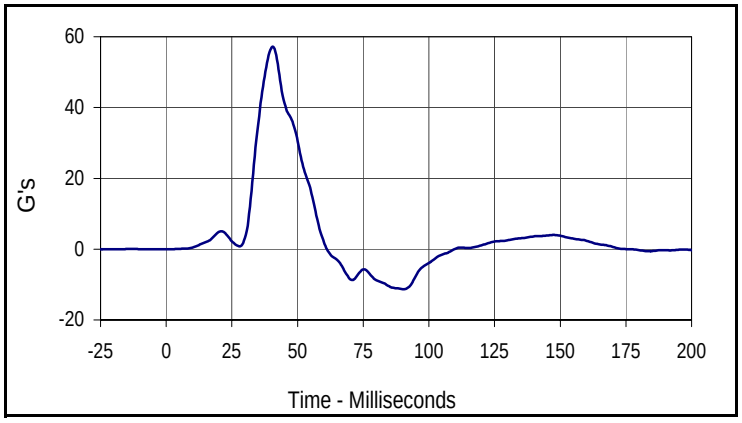
Curve Description			
Passenger Upper Rib Primary Y			
CURNO	Type	SAE Class	Units
005	FIR	FIR100	G's
Max	Time	Min	Time
27.9	63.8	-3.8	196.3



Curve Description			
Passenger Lower Rib Primary Y			
CURNO	Type	SAE Class	Units
006	FIR	FIR100	G's
Max	Time	Min	Time
34.8	48.8	-2.8	188.8



Curve Description			
Passenger Lower Spine Primary Y			
CURNO	Type	SAE Class	Units
007	FIR	FIR100	G's
Max	Time	Min	Time
37.4	46.3	-8.1	75.0



Curve Description			
Passenger Pelvis Primary Y			
CURNO	Type	SAE Class	Units
008	FIR	FIR100	G's
Max	Time	Min	Time
57.2	40.6	-11.3	90.6

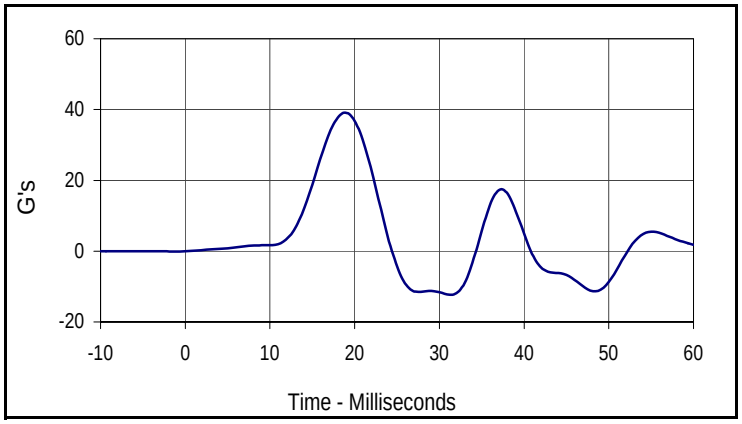
APPENDIX C
SID/HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	8/21/06
ATD Serial No.:	275	Test I.D.:	N/A

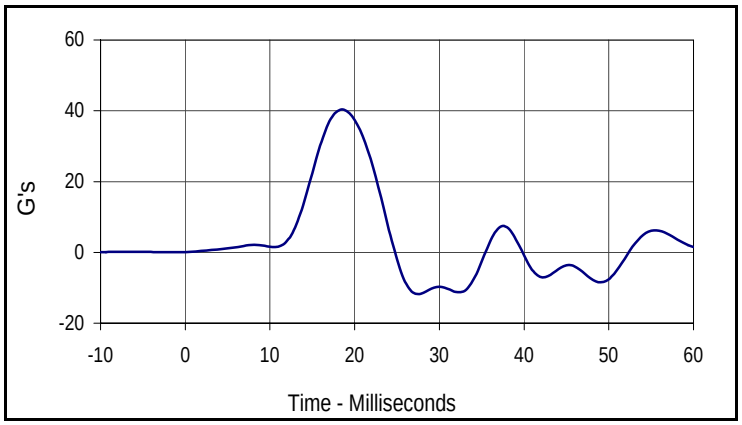
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	902	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	508	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	525	Pass
KV- Knee Pivot From Floor	mm	490 to 505	500	Pass
HW- Hip Width	mm	356 to 391	364	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/21/06
ATD Serial No.:	275	Test I.D.:	TH08X

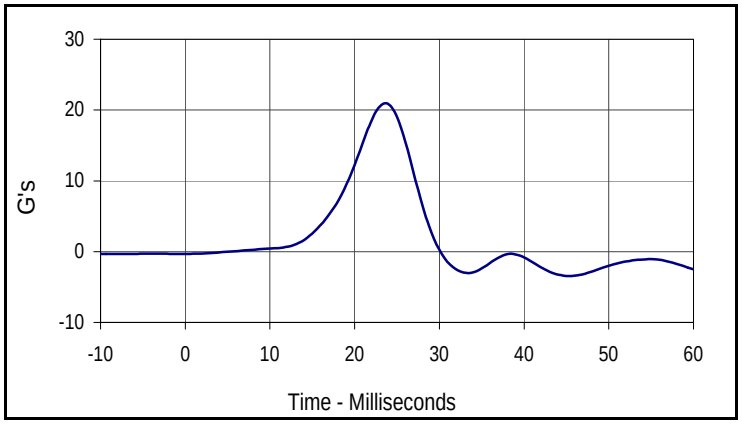
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	39.1	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	40.3	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.9	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
39.1	18.8	-12.4	31.3



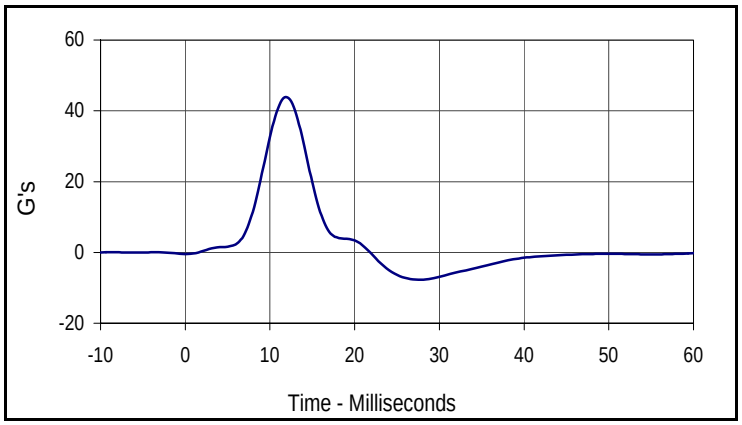
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
40.3	18.8	-11.8	27.5



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.9	23.8	-3.4	45.6

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/21/06
ATD Serial No.:	275	Test I.D.:	PL08W

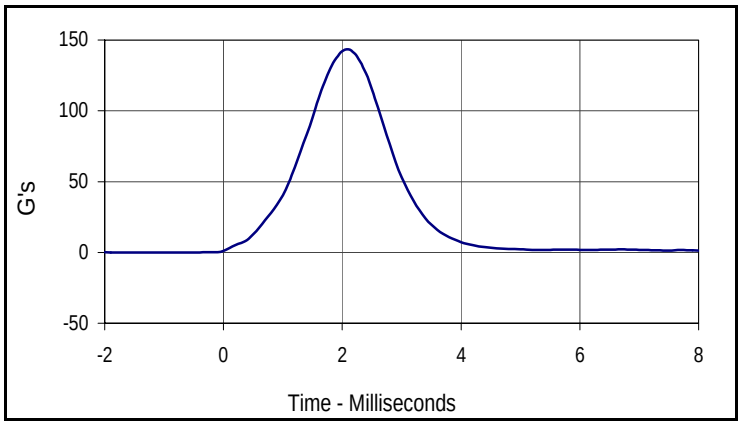
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.7	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	43.9	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.63	Pass
		Overall Test Results		Pass



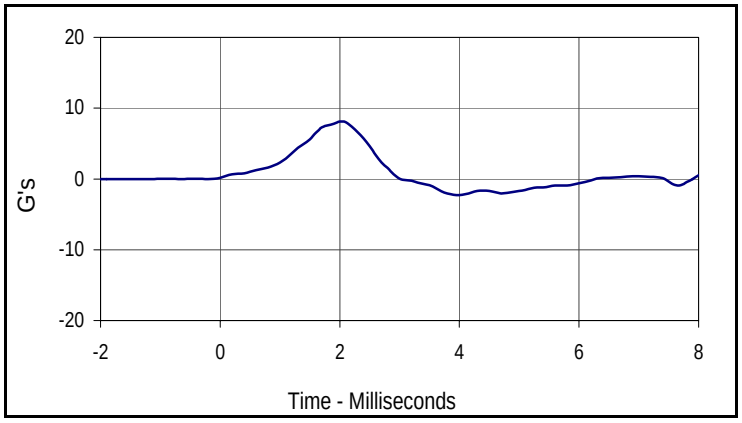
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
43.9	11.9	-7.7	27.5

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/21/06
ATD Serial No.:	275	Test I.D.:	HD08Z

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	143.5	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.1	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.5	Pass
		Overall Test Results		Pass



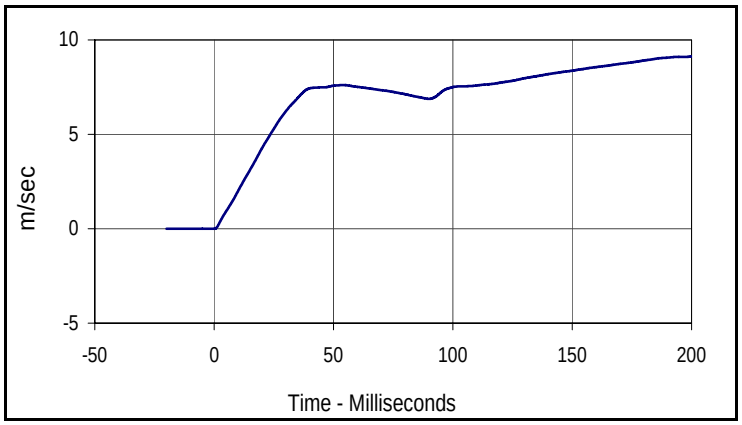
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
143.5	2.1	0.0	-0.8



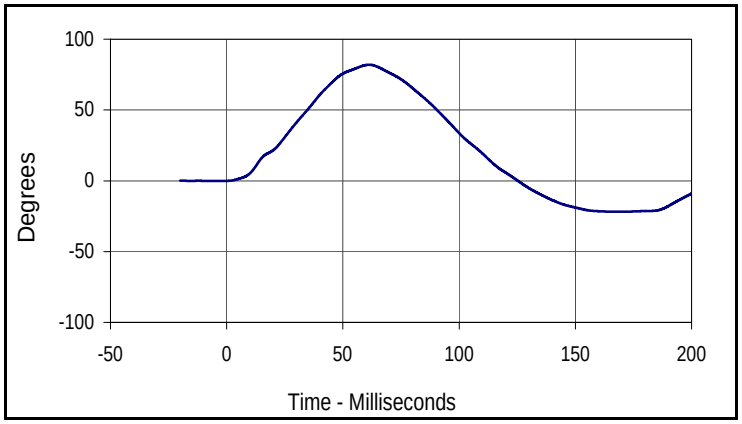
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.1	2.0	-2.3	4.0

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/21/06
ATD Serial No.:	275	Test I.D.:	NB8AC

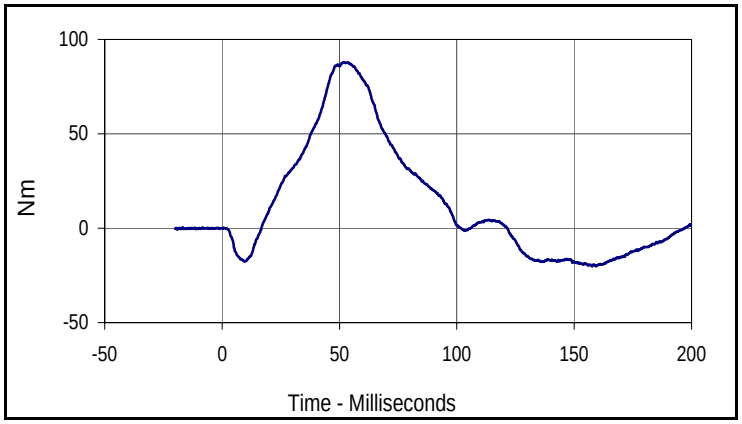
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.00	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.25	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.21	Pass
	40 to 70	m/sec	6.27 to 7.64	7.61	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	81.9	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.7	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	64.0	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	87.9	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.1	200.0	0.0	-0.1



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
81.9	61.3	-21.8	167.2



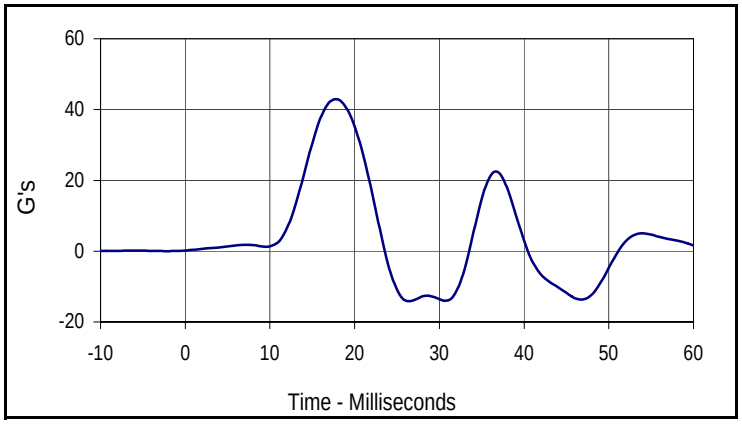
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
87.9	51.6	-20.1	157.6

Test Program:	SID / HIII External Measurements	Test Date:	8/21/06
ATD Serial No.:	274	Test I.D.:	N/A

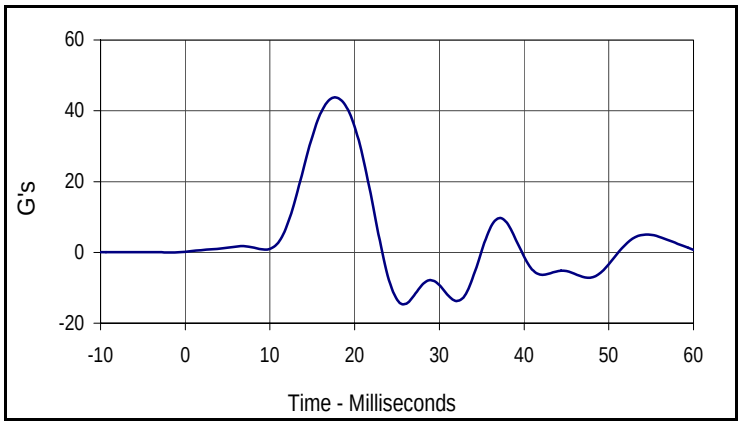
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	901	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	504	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	519	Pass
KV- Knee Pivot From Floor	mm	490 to 505	494	Pass
HW- Hip Width	mm	356 to 391	362	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/21/06
ATD Serial No.:	274	Test I.D.:	TH08Z

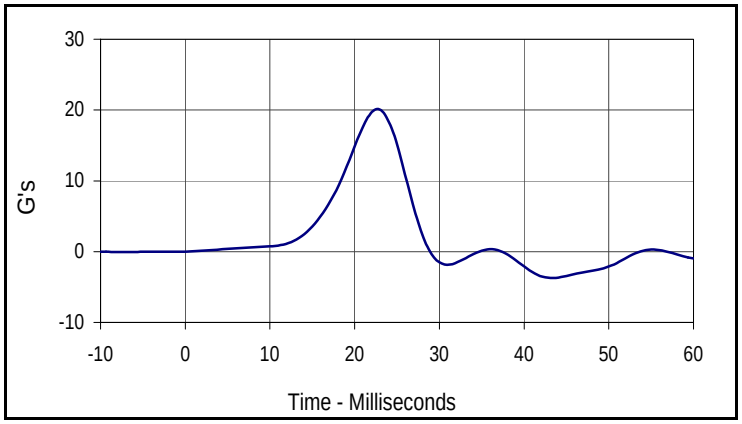
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.8	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	43.7	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.1	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.8	17.5	-14.1	26.3



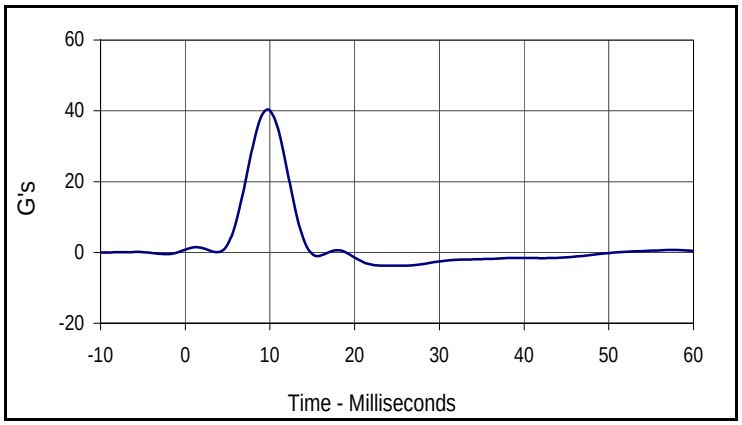
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
43.7	17.5	-14.6	25.6



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.1	22.5	-3.7	43.1

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/21/06
ATD Serial No.:	274	Test I.D.:	PL08Z

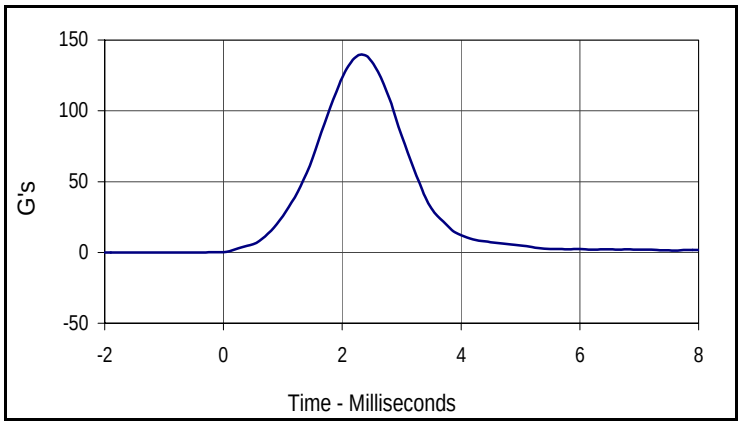
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.25	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	40.1	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	5.00	Pass
		Overall Test Results		Pass



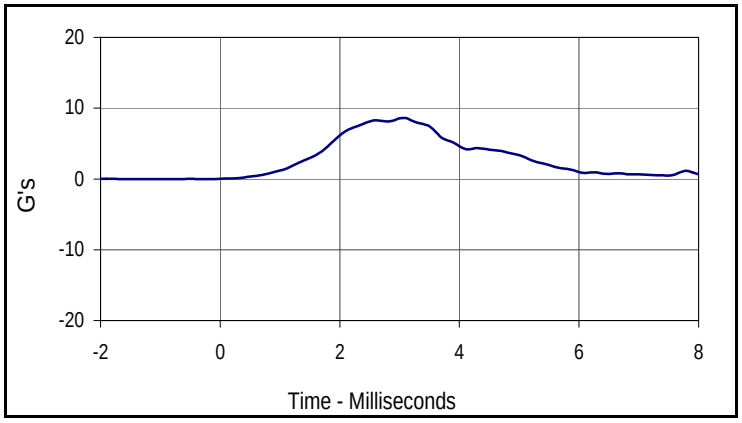
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.1	10.0	-3.7	25.6

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/21/06
ATD Serial No.:	274	Test I.D.:	HD08Y

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	139.7	Pass
Peak Longitudinal Acceleration	G's	≤15.0	8.6	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	3.5	Pass
		Overall Test Results		Pass



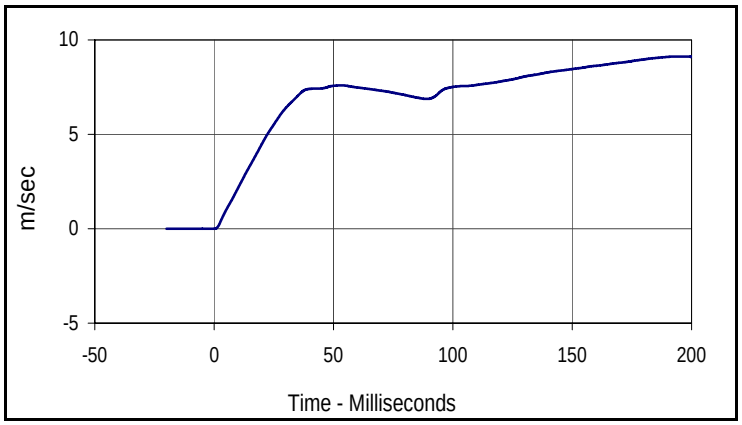
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
139.7	2.3	0.0	-0.6



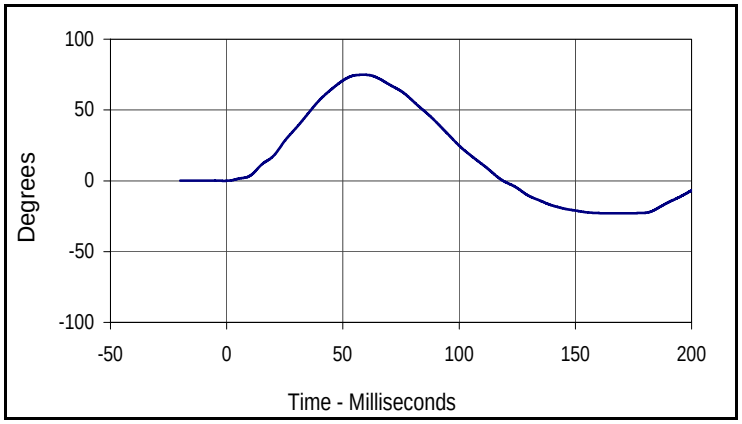
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
8.6	3.1	0.0	-0.2

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/21/06
ATD Serial No.:	274	Test I.D.:	NB8AA

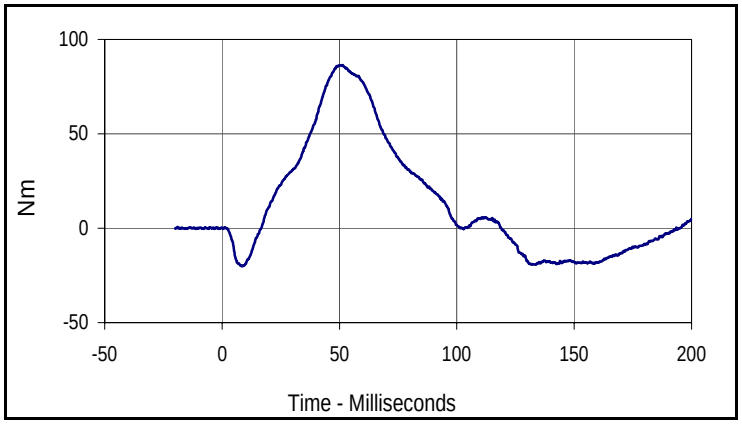
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.16	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.49	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.40	Pass
	40 to 70	m/sec	6.27 to 7.64	7.60	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	74.9	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	7.7	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.0	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	86.4	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	51.0	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.1	192.7	0.0	0.0



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
74.9	58.9	-23.0	165.2



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
86.4	51.2	-20.2	8.6

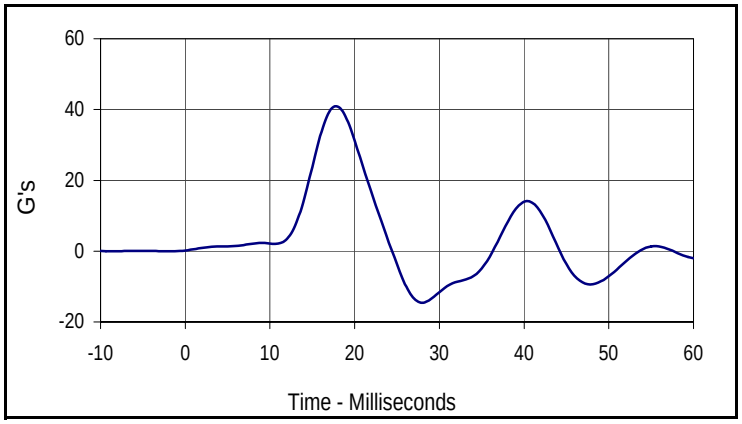
APPENDIX C
POST-TEST SID / HIII CONFIGURATION AND PERFORMANCE VERIFICATION DATA

Test Program:	SID / HIII External Measurements	Test Date:	8/28/06
ATD Serial No.:	275	Test I.D.:	N/A

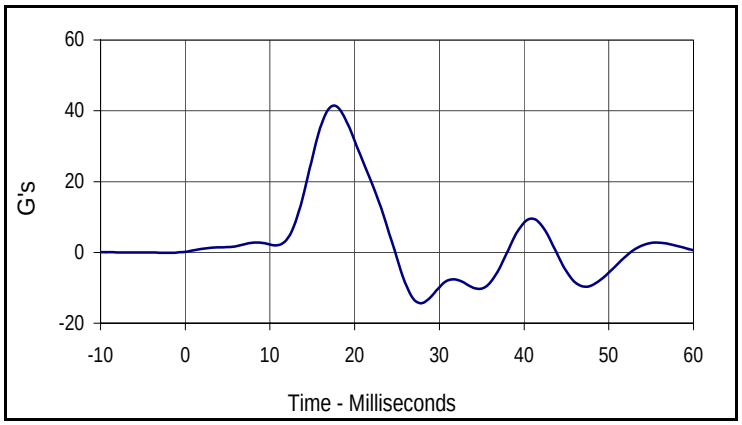
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	901	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	506	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	523	Pass
KV- Knee Pivot From Floor	mm	490 to 505	499	Pass
HW- Hip Width	mm	356 to 391	362	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/28/06
ATD Serial No.:	275	Test I.D.:	TH8AD

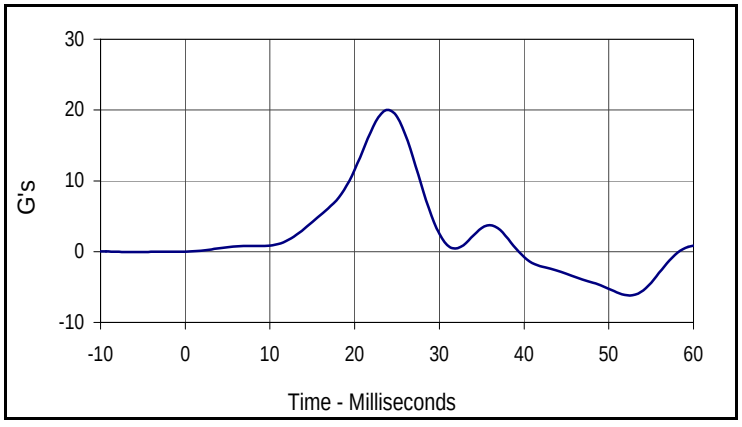
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	40.7	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	41.4	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	20.0	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
40.7	17.5	-14.5	28.1



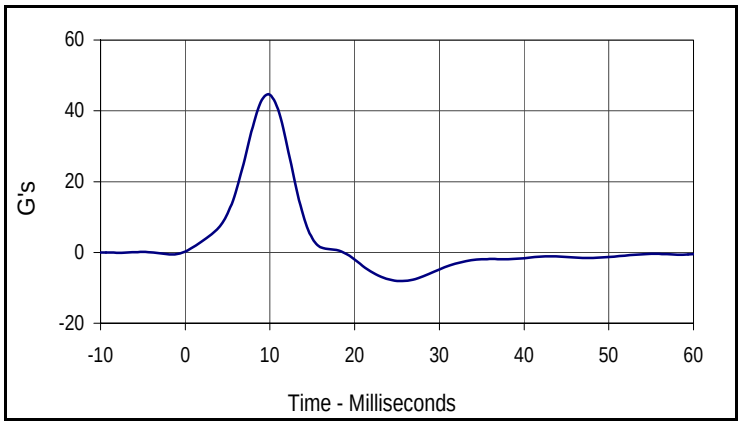
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
41.4	17.5	-14.2	27.5



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
20.0	23.8	-6.2	52.5

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/28/06
ATD Serial No.:	275	Test I.D.:	PL8AB

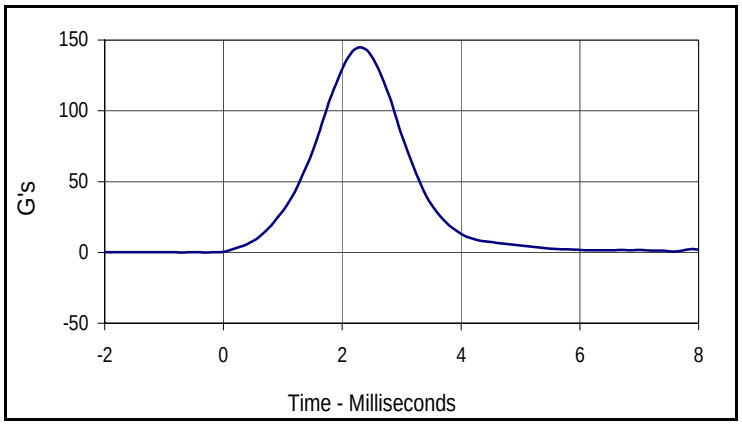
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	44.6	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.25	Pass
		Overall Test Results		Pass



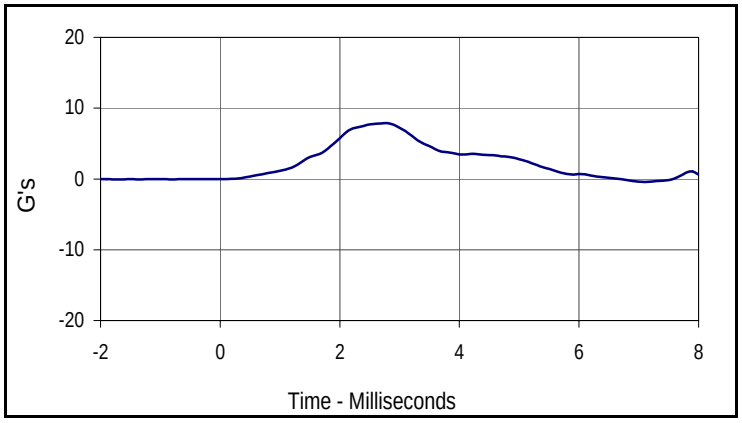
Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
44.6	10.0	-8.1	25.6

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/28/06
ATD Serial No.:	275	Test I.D.:	HD08Z

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	144.9	Pass
Peak Longitudinal Acceleration	G's	≤15.0	7.9	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	3.3	Pass
		Overall Test Results		Pass



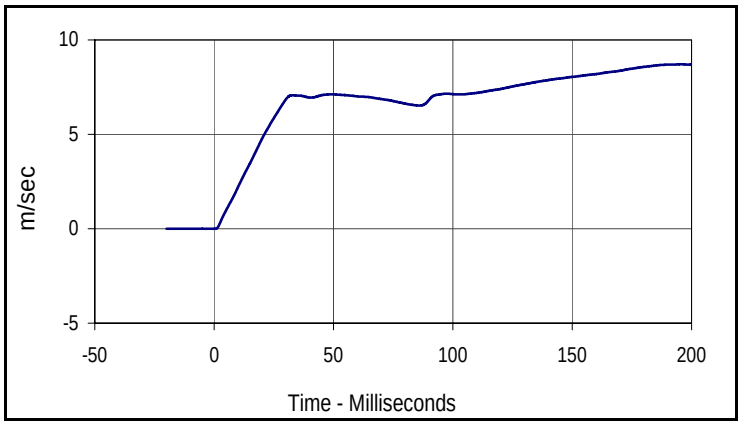
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
144.9	2.3	0.0	-0.3



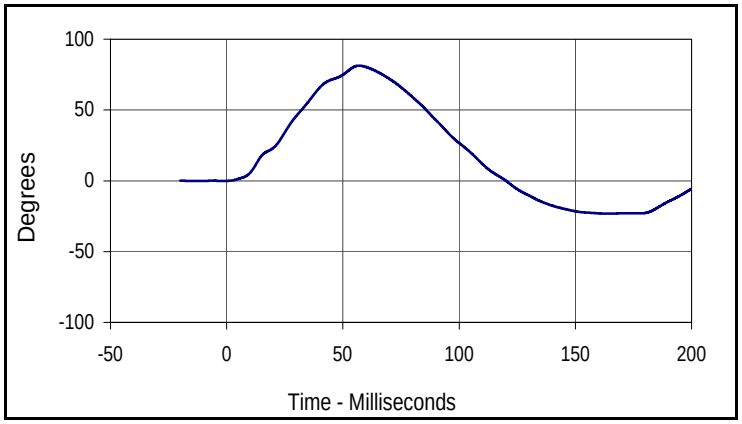
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
7.9	2.8	-0.1	-1.3

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/28/06
ATD Serial No.:	275	Test I.D.:	NB8AE

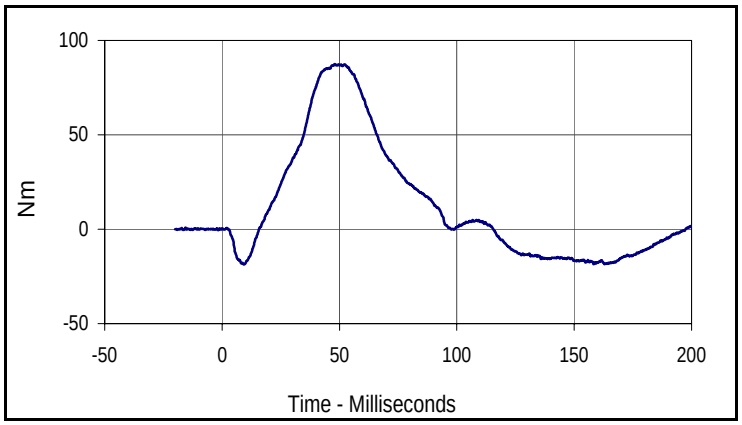
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.21	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.75	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.85	Pass
	40 to 70	m/sec	6.27 to 7.64	7.12	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	81.3	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.0	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	63.2	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	87.5	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	49.6	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
8.7	195.7	0.0	0.2



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
81.3	57.0	-23.1	163.3



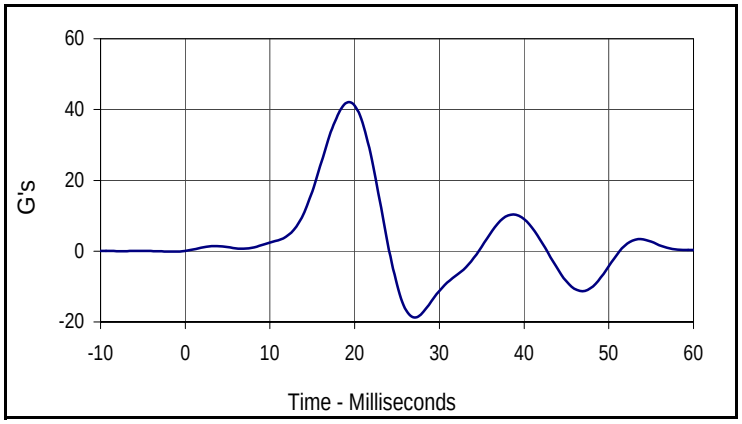
Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	600	Nm
Max	Time	Min	Time
87.5	48.0	-18.6	9.1

Test Program:	SID / HIII External Measurements	Test Date:	8/28/06
ATD Serial No.:	274	Test I.D.:	N/A

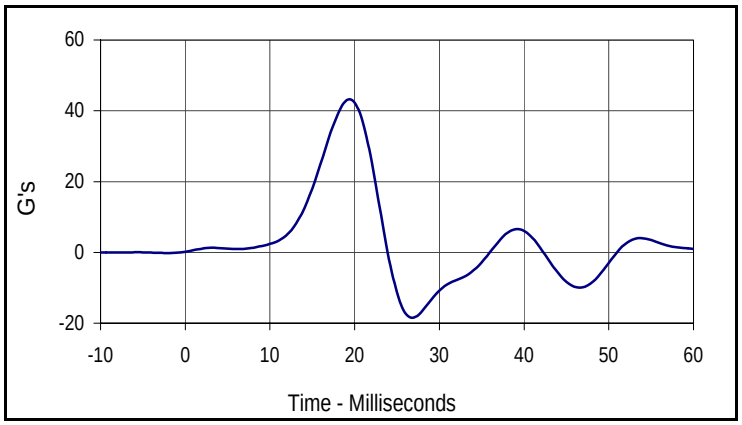
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
SH- Seated Height	mm	889 to 909	902	Pass
HP- Hip Point Height	mm	99 (reference)	99	Pass
RH- Rib Height	mm	502 to 520	506	Pass
KH- Knee Pivot From Back Line	mm	511 to 526	520	Pass
KV- Knee Pivot From Floor	mm	490 to 505	493	Pass
HW- Hip Width	mm	356 to 391	364	Pass
		Overall Test Results		Pass

Test Program:	SID / HIII Thorax Lateral Impact	Test Date:	8/28/06
ATD Serial No.:	274	Test I.D.:	TH8AE

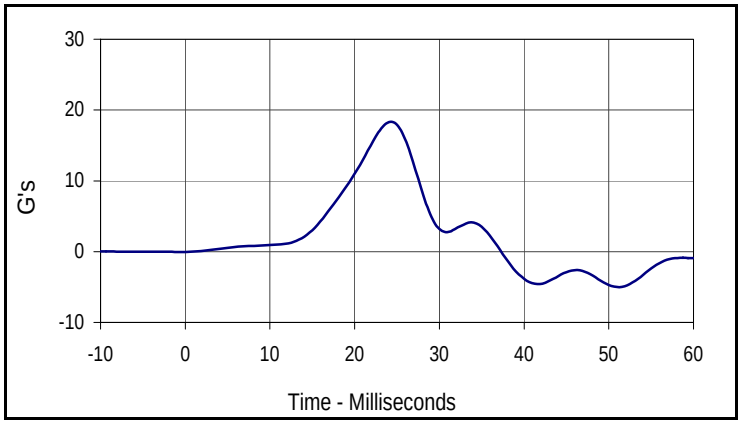
Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.1	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.26	Pass
Upper Rib Acceleration	G's	37.0 to 46.0	42.1	Pass
Lower Rib Acceleration	G's	37.0 to 46.0	43.3	Pass
Thoracic Spine Acceleration	G's	15.0 to 22.0	18.3	Pass
		Overall Test Results		Pass



Curve Description			
Upper Rib Primary			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.1	19.4	-18.7	26.9



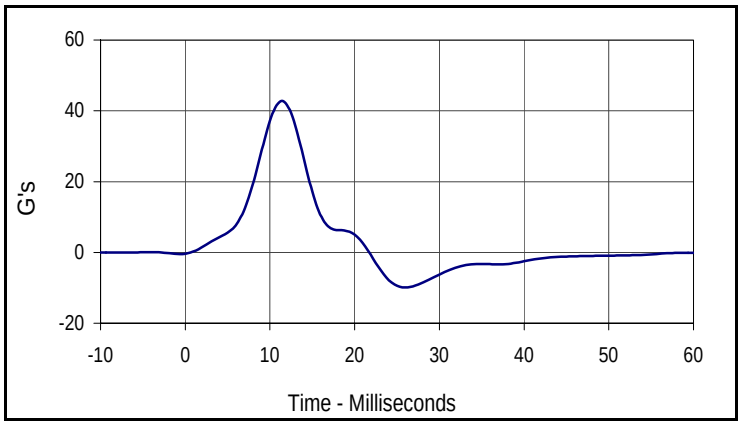
Curve Description			
Lower Rib Primary			
CURNO	Type	SAE Class	Units
002	FIL	FIR100	G's
Max	Time	Min	Time
43.3	19.4	-18.5	26.9



Curve Description			
Lower Spine Primary			
CURNO	Type	SAE Class	Units
003	FIL	FIR100	G's
Max	Time	Min	Time
18.3	24.4	-5.0	51.3

Test Program:	SID / HIII Pelvis Lateral Impact	Test Date:	8/28/06
ATD Serial No.:	274	Test I.D.:	PL8AC

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	22.2	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Probe Velocity	m/s	4.21 to 4.33	4.27	Pass
Peak Pelvis Acceleration	G's	40.0 to 60.0	42.7	Pass
Acceleration Time Above 20 G's	Msec.	3.0 to 7.0	6.88	Pass
		Overall Test Results		Pass

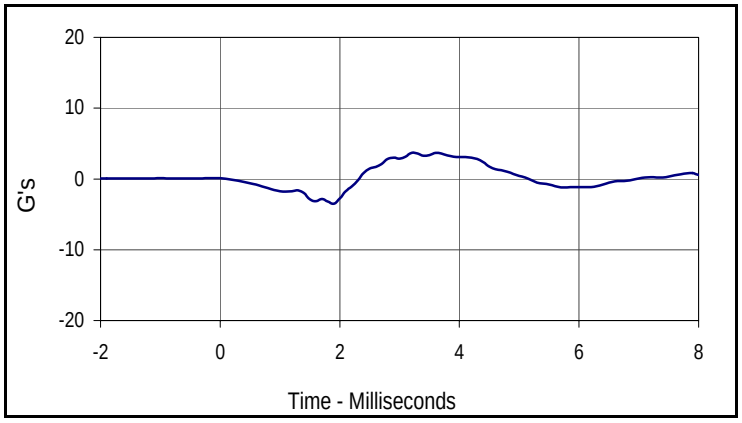


Curve Description			
Pelvis Primary Y			
CURNO	Type	SAE Class	Units
001	FIL	FIR100	G's
Max	Time	Min	Time
42.7	11.3	-9.9	26.3

Test Program:	SID / HIII Head Drop Lateral Impact Test	Test Date:	8/28/06
ATD Serial No.:	274	Test I.D.:	HD08Y

Tested Parameter	Units	Specification	Result	Pass/Fail
Laboratory Temperature	°C	18.9 to 25.6	21.9	Pass
Laboratory Relative Humidity	%	10 to 70	30	Pass
Peak Resultant Acceleration	G's	120.0 to 150.0	140.6	Pass
Peak Longitudinal Acceleration	G's	≤15.0	3.7	Pass
Is Acceleration Unimodal?	Yes/No	Yes	Yes	Pass
Oscillations After Main Pulse	%	<15	1.9	Pass
		Overall Test Results		Pass

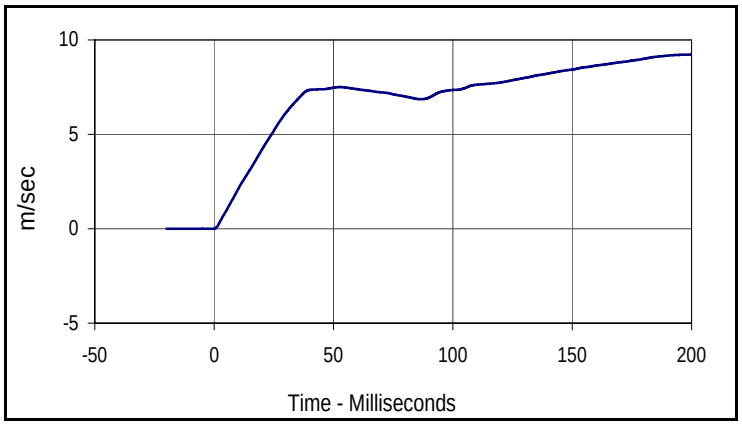
Curve Description			
Head Resultant			
CURNO	Type	SAE Class	Units
001	RES	1000	G's
Max	Time	Min	Time
140.6	2.0	0.6	0.0



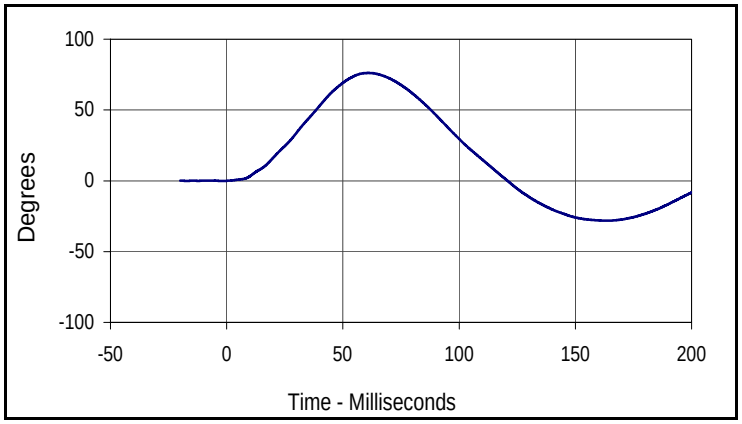
Curve Description			
Head X			
CURNO	Type	SAE Class	Units
002	FIL	1000	G's
Max	Time	Min	Time
3.7	3.2	-3.5	1.9

Test Program:	SID / HIII Neck Pendulum Lateral Test	Test Date:	8/28/06
ATD Serial No.:	274	Test I.D.:	NB8AG

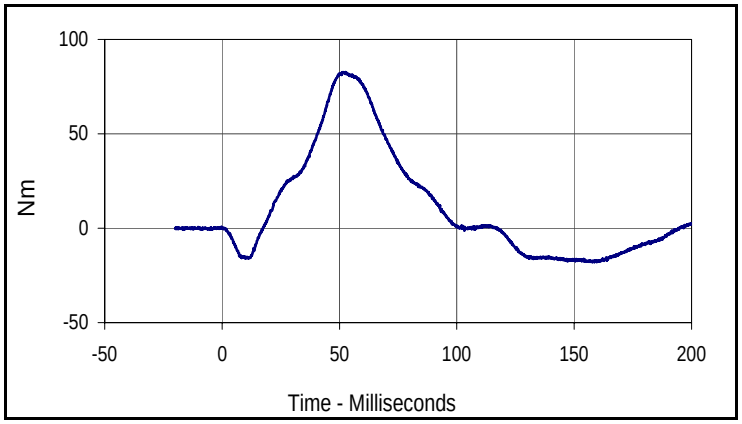
Tested Parameter		Units	Specification	Result	Pass/Fail
Laboratory Temperature		°C	20.6 to 22.2	21.9	Pass
Laboratory Relative Humidity		%	10 to 70	30	Pass
Pendulum Velocity		m/sec	6.89 to 7.13	6.97	Pass
Pendulum Deceleration	10 Msec.	m/sec	1.96 to 2.55	2.09	Pass
	20 Msec.	m/sec	4.12 to 5.10	4.19	Pass
	30 Msec.	m/sec	5.73 to 7.01	6.13	Pass
	40 to 70	m/sec	6.27 to 7.64	7.50	Pass
"D" Plane Rotation	Max	Degrees	66.0 to 82.0	76.2	Pass
Max Rotation Time After Peak Moment		Msec.	2.0 to 16.0	9.3	Pass
Rotation Time From Peak to Zero Angle		Msec.	58.0 to 67.0	60.0	Pass
Moment About Occipital Condyle		Nm	73.0 to 88.0	82.7	Pass
Positive Moment Decay, Time To 0 Nm		Msec.	49.0 to 64.0	50.3	Pass
			Overall Test Results		Pass



Curve Description			
Pendulum Velocity			
CURNO	Type	SAE Class	Units
001	FIL	180	m/sec
Max	Time	Min	Time
9.2	200.0	0.0	-0.4



Curve Description			
"D" Plane Rotation			
CURNO	Type	SAE Class	Units
003	FIL	60	Degrees
Max	Time	Min	Time
76.2	60.9	-28.2	163.5



Curve Description			
Moment About Occipital Condyle			
CURNO	Type	SAE Class	Units
004	FIL	60	Nm
Max	Time	Min	Time
82.7	51.6	-18.0	158.6